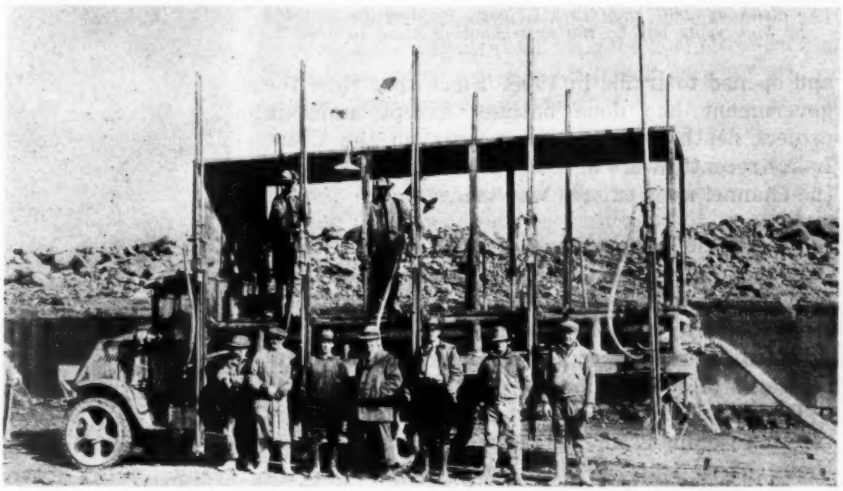
THE EXCAVATING ENGINEER
FOUNDED 1905

MAY 1932
VOL. XXVI NO. 5

Connolly Contracting Company to open WEST NEEBISH six months ahead of schedule

Gang-drill trucks, ship camp and power plant, and other interesting construction methods used in excavating half million yards of rock in deepening St. Mary's Channel between Lakes Superior and Huron.



One of the special gang drill trucks that solved a difficult problem on this well managed job. In the center of the group in front of the truck is P. L. Connolly, president of the Connolly Contracting Company.

CONNOLLY CONTRACTING COMPANY jobs are always worth watching by the student of construction methods in search of examples of efficiency and ingenious methods. Probably one of their most interesting operations in recent years is that, now nearing completion, of deepening West Neebish Channel in St. Mary's River south of Sault Sainte Marie.

St. Mary's River is a 63-mile stream connecting Lake Superior and Lake Huron. Until completion of the Weitzel and Poe locks in the 1880's it was closed to navigation because of rapids through which even rowboats passed with difficulty. Between Lake Superior and Lake Huron there is a 22-foot drop, most of which is taken in the short stretch of St. Mary's rapids, about 49 miles north of the river's mouth.

World's Busiest Canal

Four great locks on the American side of St. Mary's falls now lift and lower the shipping past this fall. And a tremendous amount of shipping it is too. During the shipping season an average of one vessel passes every eighteen minutes. Even though the locks and river are ice bound for four months—from the middle of December to the middle of April—the traffic through St. Mary's Canal for the short eight months of navigation is greater in net tons than the combined yearly traffic through the Panama, Suez, Wellington and Kiel canals.

Back in 1906 navigation on the Great Lakes had increased to such an extent that the channels of the St. Mary's River were too congested for safety. So the United States Government made several improvements, among them being that on the West Neebish Channel. West Neebish, most westerly of the three channels into which the river divides to encircle Neebish and St. Joseph Islands, flows between the American mainland and Neebish Island. Boats down bound from Lake Superior to Huron ordinarily use the West Neebish Channel, although during the period of construction all traffic is routed through the other channel. The east branch is seldom used.

The original improvement here provided for the construction of a channel 300 feet wide, 22.4 feet deep and 9,400 feet long. The work was completed

The clean up drill gang uses Chicago Pneumatics to bring the high spots left by the first shooting down to grade.

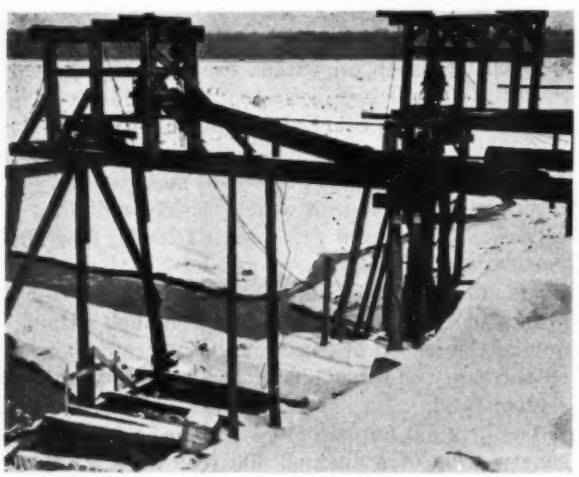
and opened to traffic in 1908. Since that time the government has done nothing except maintain project depth, but vessel interests on the Great Lakes recently were able to show conclusively that the channel as it existed was inadequate.

Over Half Million Yards of Rock Excavation

It was, therefore, decided to deepen West Neebish Channel by five feet to a minimum depth of 27 feet. Including allowed over-depth of two feet, this involved excavation of a maximum of 538,000 cubic yards of solid rock.

The contract was awarded to the Connolly Contracting Company of St. Paul who started work on their coffer dams in May, 1931. With a rented dredge, derrick scows, and rock-fill shipped in self-unloading barges from the Inland Lime & Stone Company quarry near Manistique, short work was made of throwing the two coffer dams across the ends of the 9400 foot channel.

It was necessary to build the coffer dams extra strong because of the ice floes which, during the winter months, tend to break through any but the strongest dams. To avoid this danger which twice caused the work to be interrupted during the 1908 operations, the contractor constructed rock and earth-fill crib dams. These are some 56 to 60 feet thick on top sloping out considerably at the bottom. The lower one is approximately 2600 feet long and the upper 1600 feet including portions of the 1908 dams which were strengthened and rebuilt. They close off the portion of the channel to be deepened (9400 feet long, 300 feet wide). The next step was to remove the one billion gallons of water which remained inside the coffer dams. Using four 20-inch Worthington Axiflo pumps this water was pumped out in nineteen days and the job was ready for dry excavation the latter part of September.



Dewatering plant at upper coffer dam.

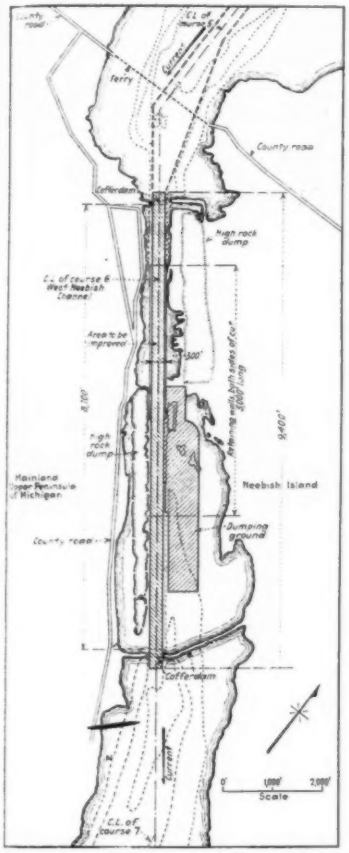
The shovels follow one another in adjacent cuts like a fleet of harvesters going through a grain field.

Sumps were then excavated for removal of the seepage water which is handled by the four big Worthingtons as needed and with three small American electric well pumps. The operations of 1908 had left a fairly smooth rock floor with channeled walls topped by masonry. While the old depth had been fixed at twenty-two feet considerable of the old excavation had been made to the depth of twenty-four feet. The rock formation is hard Niagara limestone of dolomitic nature weighing 4600 pounds per yard. It contains excessive clay seams which cause considerable difficulty in blasting and drilling.

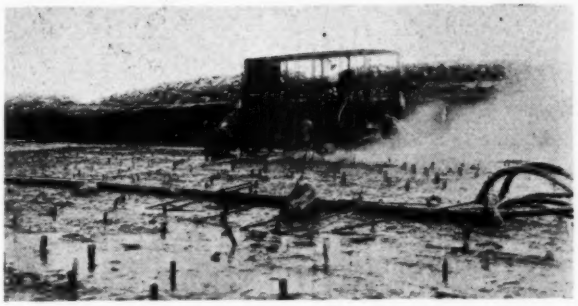
Drills, in Gangs of Ten, Operated From Trucks

Because of the shallow excavation required, it was evident that one of the chief problems was that of drilling. In order to secure proper breakage to grade and to break up the rocks sufficiently for handling, it was necessary to drill holes on 4½ foot centers and averaging about six feet deep (to 30 foot level). Obviously drilling these holes over the entire floor of the channel would be a long and tedious job if handled by the usual drilling methods. Studying the problem Mr. Connolly conceived the idea of mounting a battery of drills on trucks and working them very much as a drill boat

is operated. Calling in the Worthington Pump and Machine Corporation engineers Mr. Connolly assigned to them the task of arranging ten of the Worthington self-feeding rock drills on two heavy duty Mack trucks. The drills, nine feet apart laterally and 4½ feet apart in the line of travel, were placed five on each side of each truck. The two 5-ton Mack trucks had been stripped to the chassis and then lengthened sufficiently to accommodate the required drills. Six by six oak stringers were laid on the reinforced chassis frame and a three-inch oak sub-floor was placed on these stringers. This was reinforced by a 3/16 inch boiler plate on which was placed the drill mounting. This mounting, including pedestals and cross bars, was welded together as a single unit being connected by four-inch, extra heavy pipe. The mounting consisted of a longitudinal bar extending the full length on each side of the truck platform. On this were placed 4½-inch saddle clamps similar to those employed on the usual mine or shaft bar. The cone-trunnions were then set into these saddle clamps. A two-inch oak floor



Sketch map of deepening operations in West Neebish Channel of St. Mary's River



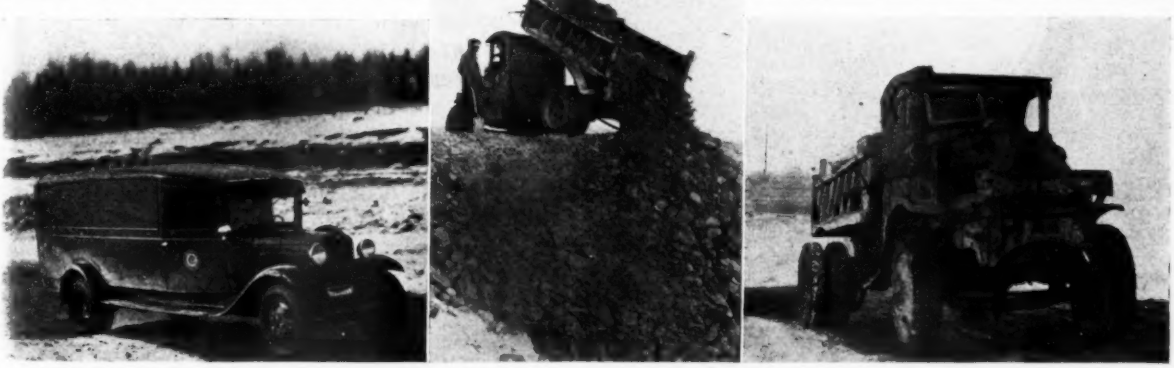
Ten Worthington drills mounted on this Mack truck put in 10 6-foot holes every seven minutes.

for the operators to stand on was laid on the cross bars of the drill mounting. Pipe extensions were run from each pedestal to support a shelter roof and additional protection against bad weather was provided by hinged side doors.

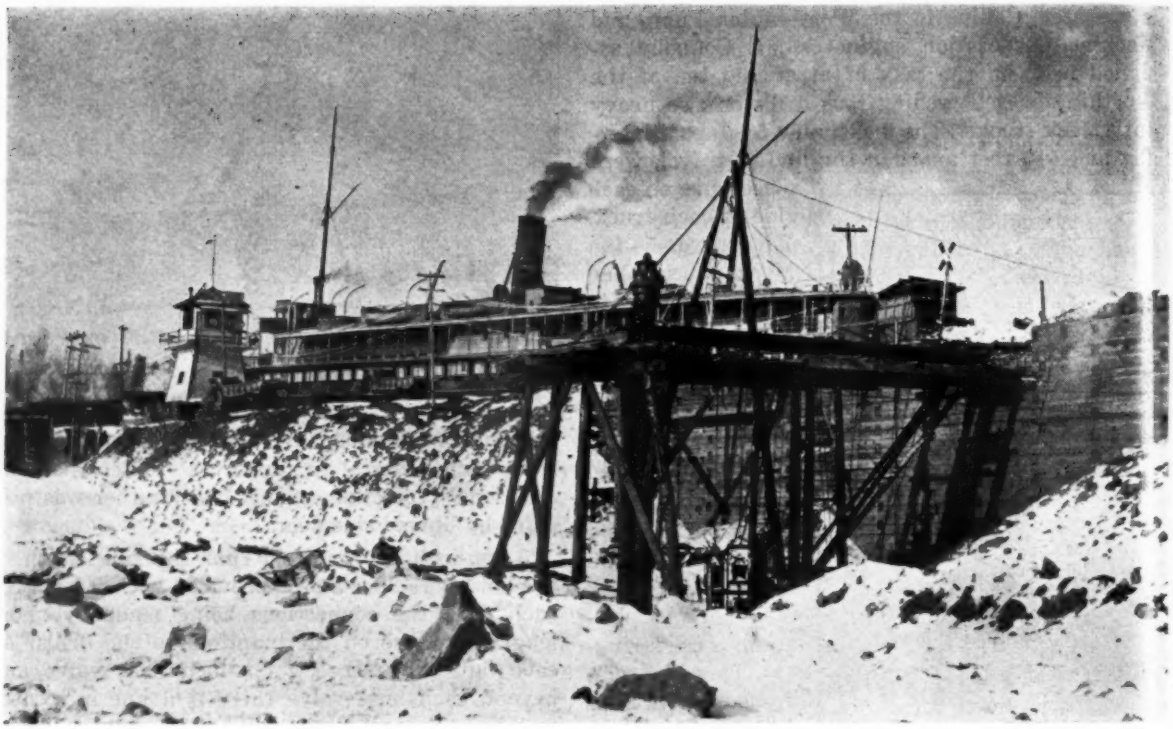
A ten-inch air manifold runs the full length of the truck sub-floor and is provided with outlets for each drill, the connections being made by short lengths of hose on the manifold to the drills. At each outlet is placed a one-inch hose valve and beyond each hose valve there is a line lubricator to which is coupled the hose supplying the drills. At the rear of the manifold a Y connects with two, 2½-inch air hose from the main line. These hose, 150 feet long, give the truck an operating area of 300 feet before new connections have to be made.

The drills are self feeding and have a three-inch cylinder diameter and a three-inch stroke. The drill engine is mounted on a slide which works in ways which are an integral part of the air cylinder. To enable the machine to spot and collar the drill hole without the necessity of man guidance, an extension arm fastened to the forward end of the feed cylinder gives a hinged-cap bearing that acts as a guide for the drill steel.

When the drill truck is in operation two men seated on the drill platform operate the throttles of all ten machines. Two men are stationed on each side of the truck on the ground. These four ground men change the drill steel



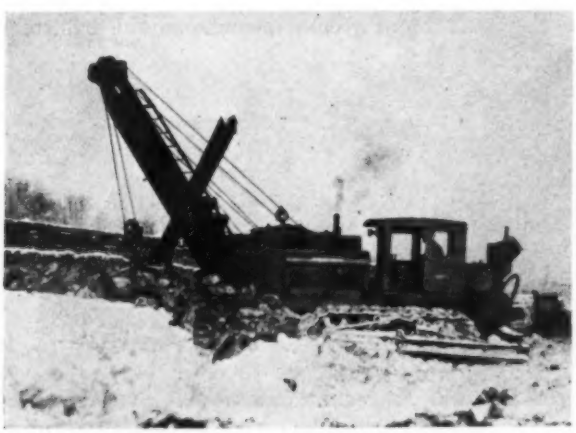
Connolly Contracting Company have found that careful maintenance and servicing of all equipment pays large dividends. At the left is one of their service trucks. The pictures at the right show two of the fleet of Macks. All trucks are checked by mechanics at the garage once a day. Repairs are made as soon as any trouble is indicated instead of continuing the unit in service as long as it will run.



Coffer dam and pumps at upper end of the channel. The Indiana is tied up in the basin just outside this dam.

every fifteenth move of the truck. The driver of the truck enters all performance data for the numerous records which are kept and supervises the lubrication of the unit. Should one or two of the holes lag behind the rest the truck is moved to a new position and a hand-held drill then cleans up the slow holes. The first truck would proceed the length of the channel, drill its two rows of holes nine feet apart on 4½-foot centers. Following would come the second truck straddling the outside row of holes and putting in one line of holes on the center line of the first truck and the second line 4½ feet outside.

To avoid trouble due to the mud seams a new drill bit was designed which, although of the bull-bit family, differs from it in several important respects. It has a reaming gage, but it has the blowing hole in the flat side instead of through the end of the bit. The gage diameter of the body of the steel has been reduced to the point where it offers the least resistance to extraction. While the drill steel was regularly changed every fifteen holes, it was found possible to drill as many as 27 holes with this type of bit before resharpening was necessary.



Caterpillar 60 with LaPlant-Choate bulldozer cleaning up for one of the shovels.

In the operation of the drills it was found possible to complete a drill cycle every seven minutes. In other words ten six-foot holes were drilled by the seven-man crew in this length of time. As high as 1916 six-foot holes have been completed by the two trucks in 24-hours—more than two miles of hole! Each truck is brilliantly flood-lighted and operates on three shifts, 24 hours a day.

To February 1st 225,000 holes had been drilled with these gang drill trucks and with a battery of Chicago Pneumatic free hammers used for clean up work. After the trucks had completed the drilling of the floor one of them was used, carrying eight drills all on one side, to do the channeling along the wall by line drilling method. In this work holes are put in on four inch centers and an excellent result was obtained.

The drill sharpening is handled at very completely equipped shops on the job which have been carefully arranged so that the drill sharpening is routed through in straight line. Ingersoll-Rand

sharpeners are used in connection with Worthington furnaces. The sharpener is capable of handling 1200 pieces every twenty-four hours. One furnace is used for heating the steel under automatic pyrometer control for the forging operations and the second in heating for tempering. The quenching tank is designed with a water-bubble in which the cutting edge of the bit is hardened thus preventing the formation of steam bubbles which ordinarily cause soft spots. In one end of the water quenching tank is submerged an oil tank for the quenching oil in which the drill shanks are hardened.

Compressed air is furnished from four Ingersoll-Rand compressors powered by General Electric and Westinghouse motors. Each of these compressors has a capacity of 1200 cubic feet per minute.

Blasting is with du Pont Gelax 60 and 40% in equal quantities and electric blasting caps. Six sticks were usually loaded per hole. From 300 to 600 holes are usually fired in each shot.

Dragline and Shovels Load Rock

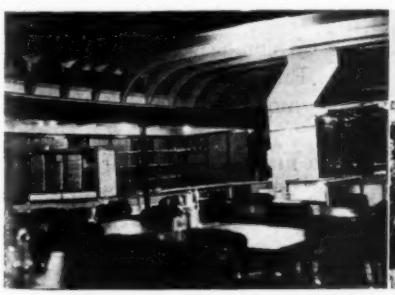
Two methods are used in loading out the rock. Where dumping is possible directly over the retaining walls, a Marion 125 steam dragline with 3½-yard bucket and 125-foot boom is used. This excavates the rock and casts it directly into spoil piles on top of the banks. Log racks are used along the top of the wall to prevent damage from the cables catching on projections of the rock.

While this dragline operation proves an economical way of removing the rock a considerable percentage of the material can not be so easily disposed of. Four Bucyrus-Erie Gas+Air shovels were assigned the task of loading this material to dump trucks which haul it up a ramp with an eight percent grade to a dump on the east bank and on the southern end of the job. Shovels and dragline work two eight-hour shifts per day. As on all Connolly jobs two truck spotting is practiced wherever possible. There are twenty-four Macks hauling from the four Gas+Airs (in addition to several others handling supplies). Some of these trucks are eight years old but neither their appearance nor the way they roar up the road that angles out of the cut indicate that they are any the worse for their long years of hard service. The haul from shovel to dump averages about five-eighths mile for the job.

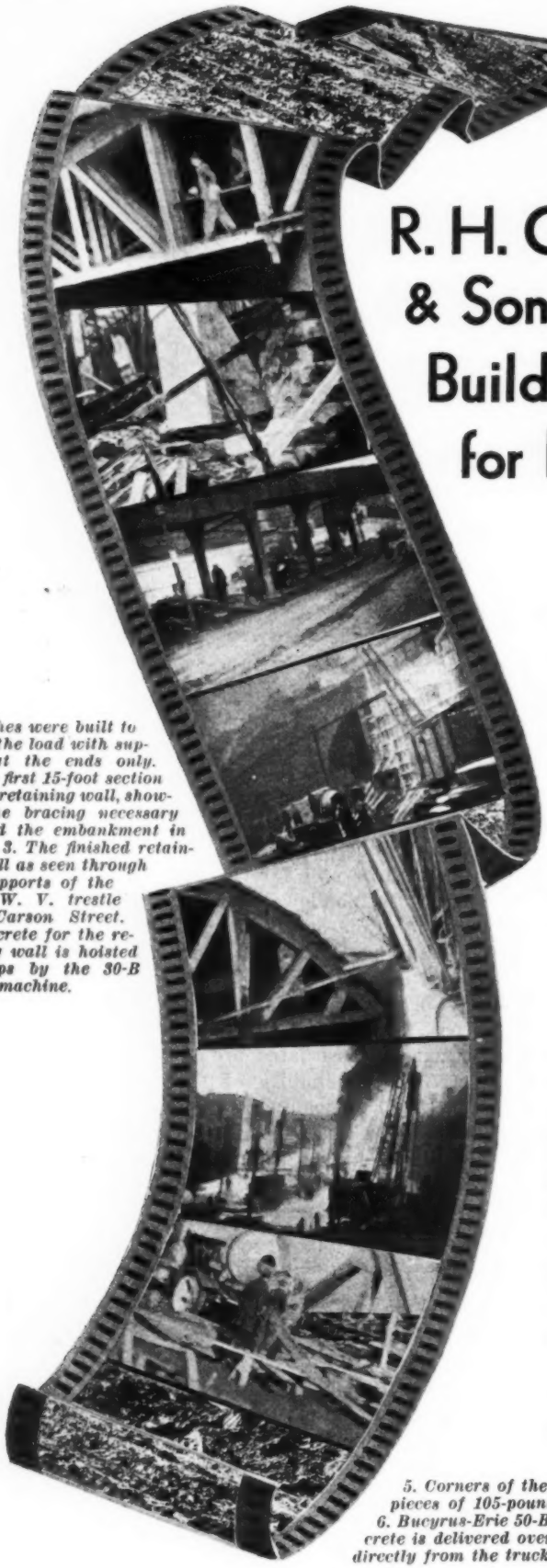
Well equipped shops and garage, open 24 hours a day, keep all equipment operating at peak of efficiency. Note how equipment not in service which must be kept outside is protected by canvas covering. Below a portion of the compressor room where G.E. & Westinghouse motors operate the big Ingersoll-Rand compressors.

Owing to the shallow bank, hard digging and carrying the grade on rough rock bottom, no unusual loading records have been obtained compared with some of the dirt loading records the Connolly organization have so frequently made in the past with their Gas+Airs. Superintendent McKee and his associates are very enthusiastic, however, over the ability of these machines to handle the difficult loading assigned to them. Output has run as high as 695 yards per 8-hour shift, the average production per shovel being about 400 yards per shift.

(Continued on Page 243)



The S.S. Indiana makes a camp "fit for a king." At the left a portion of the dining salon where excellent meals are furnished on the "serve yourself" plan. At the right, one of the recreation rooms.



1. Arches were built to carry the load with support at the ends only. 2. The first 15-foot section of the retaining wall, showing the bracing necessary to hold the embankment in place. 3. The finished retaining wall as seen through the supports of the P. & W. V. trestle over Carson Street. 4. Concrete for the retaining wall is hoisted in skips by the 30-B Diesel machine.

R. J. Cunningham, Vice-President and General Manager

R. H. Cunningham & Sons Company Building South Approach for New Ohio River Bridge

Contract amounts to nearly three-quarters million dollars.

THREE-QUARTERS of a mile from the source of the great Ohio River a new bridge now reaches out to touch the opposite banks of this historic waterway. Not many months will pass before this bridge will be alive with traffic—traffic that is used to bridges, for is Pittsburgh not sometimes called the "City of Bridges"?

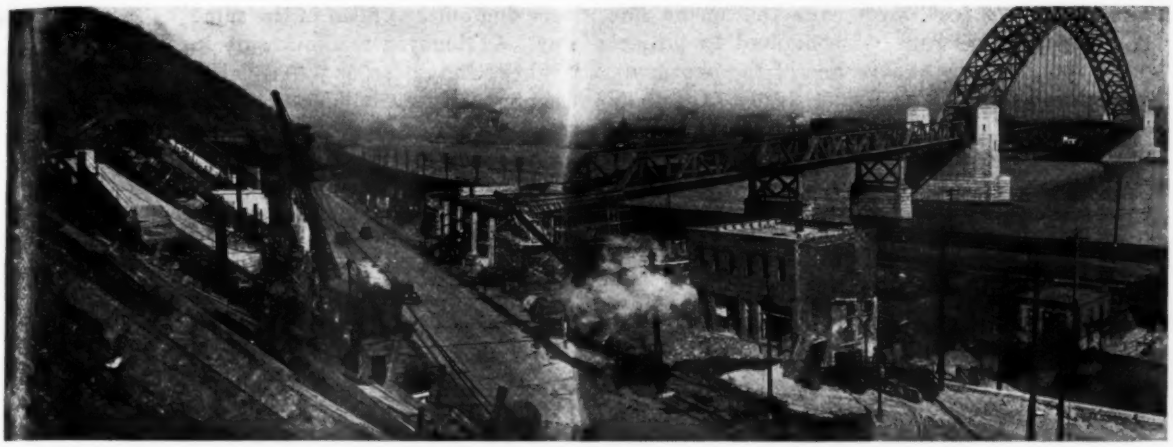
Pittsburgh's founding was on the point of land formed by the joining of the Allegheny and Monongahela Rivers to become the Ohio and in its growth it is only natural that many mammoth spans of steel should cast their shadows on the passing waters below.

Novel Feature Adds to Beauty of Bridge

With not only a clear understanding of present needs, but also a keen vision of future requirements, Allegheny County Department of Highways (and in particular the Bureau of Bridges) planned and constructed the graceful span known as the West End—North Side Bridge. It will relieve the Liberty Tubes, provide an easy and direct route for traffic from the southern to the northern part of the county and visa versa. Traffic from the south on Saw Mill Run Boulevard, Banksville Road, Steubenville Pike and Carson Street West will find easy access to North Pittsburgh without having to go down the river more than a mile or into Pittsburgh.

The bridge, having a main span of 780 feet, is a crescent-tied arch type, with the floor supported by cables—a rather novel feature for a bridge which

5. Corners of the arch rest on 12x12 timbers which are supported on pieces of 105-pound rail imbedded in the abutments for this purpose. 6. Bucyrus-Erie 50-B steamer driving a concrete pile 54 feet long. 7. Concrete is delivered over the completed bridge and poured into forms either directly from the truck or with the help of a Barber-Greene belt conveyor.



Looking west on Carson Street from the embankment of the Pennsylvania Railroad. In the foreground, to the left, are two of R. H. Cunningham & Sons' Bucyrus-Erie machines and across Carson Street just this side of the bridge is another Bucyrus-Erie. In the upper left-hand corner can be seen two of the Dravo Contracting Company's railroad cranes. At the right on the river's edge are the Pittsburgh and Lake Erie's tracks and a few feet this side are the Pittsburgh and West Virginia tracks. The trestle of the latter's spur crossing Carson Street can be clearly seen in the distance.

is not a suspension bridge. It has a 40-foot roadway and will cost when completed in the neighborhood of $3,500,000. Work was started on the bridge in March, 1930, and is planned for completion May 1, 1933. The bridge itself is practically complete now (March 9, 1932) but cannot be opened to traffic until the south approach is finished.

This part of the project reveals the great care taken to provide easy, safe and fast traffic outlets for the new bridge, and will eliminate interference of the bridge traffic with the constant flow of cars which pass but do not wish to use the new span. Lincoln and William Penn Highways (U. S. Highways 30 and 22) enter Pittsburgh from the west via South Main and Carson Streets as well as U. S. 19. Carson Street at this point is also State Highway 51.

Difficult Problems Overcome in Planning South Approach

The main problems in planning the South approach where the railroad embankment rising about 60 feet above Carson Street carrying the tracks of the main line of the Pennsylvania Railroad at right angles to the bridge and less than 200 feet from the end of the bridge proper, and the heavily traveled Carson Street running parallel to the railroad and less than 100 feet from the end of the new span. With the ready co-operation of the Railroad, plans were laid to make this bridge intersection meet not only the increased traffic demand after the bridge is opened but also eliminate hazards which exist at present. The contract for this approach, involving nearly $750,000.00* was awarded to R. H. Cunningham & Sons Company, Turtle Creek, Pennsylvania, well-known Western Pennsylvania Contractors. Work on this contract was started October 13, 1931 and according to the contractors present estimate will be finished this year or shortly after the first of next year.

The first task encountered was the extending of the culvert over Saw Mill Run to permit the widening of Carson Street.

Mass concrete abutments for the culvert were built 13 feet thick at the bottom and 9 feet thick at the spring line of the arch. All foundations for both the arch and wing walls to confine the Run to the desired channel were built in open steel cofferdams, down to bedrock—some 30 feet measured from center of arch. A Bucyrus-Erie 50-B steamer drove the steel sheet piling for these cofferdams and a Bucyrus-Erie 30-B Diesel handling a clamshell bucket cleaned out.

Self-Supporting Arch Completed in Half Allotted Time

The barrel type reinforced concrete arch with a clear span of 36 feet was then built over the Run. This Run very often will rise one foot per hour in time of storm so that the depth of water under the arch might vary in twenty-four hours from two feet to eighteen feet. This made the use of shoring under the arch forms impracticable.

To take care of this condition when the abutments were being built, four foot long pieces of 105 pound railroad rail were imbedded in the abut-

---

*Note: On the Cunningham contract there are 104 different items, of which the following are the most important:

Structural Steel and Anchor Bolts	61,600 lbs.
Steel reinforcing	1,800,000 lbs.
Earth embankment	6,500 cu. yds.
Granular slag embankment	54,000 cu. yds.
Granite curbing	14,000 li. ft.
Concrete sidewalk	52,000 sq. ft.
Block stone pavement, on 8-inch concrete base	28,300 sq. yds.
Conduits for wiring	8,500 li. ft.
Excavation	31,300 cu. yds.
Concrete	20,000 cu. yds.
Premoulded concrete pipe	16,800 li. ft.
Circular foundations for columns, 4-foot dia.	3,200 li. ft.
Membrane waterproofing	7,080 sq. yds.
Membrane waterproofing, protected by ¾-inch asphalt plank	6,100 sq. yds.
Tar waterproofing	5,500 sq. yds.
Sewer, 24-inch down	2,700 li. ft.

ments about two feet down from the spring line of the arch. These rails were allowed to project about a foot beyond the flow line of the abutment.

In building the arch centering, 12 by 12 timbers were laid on top of these projecting rails and bowstring-type built-up wooden arches were rested on these 12 by 12 stringers. These bowstring arches were built up of 2 by 10 plank and the planks forming the top chord of the bowstring were cut to the radius of the arch. The top chord was formed of three pieces of these 2 by 10 plank; the bottom chord of two pieces of 2 by 10 plank and the interior bracing of the arch forms of 2 by 6 plank.

The end reaction of each of these centering members was 58,000 pounds and they were placed on three foot centers.

E. B. Wagle, Superintendent

The lagging on top of these arch forms was a double thickness of 2 by 6 boards. When the arch was poured the maximum deflection at any time at the center of the arches was one-fourth inch.

The whole of this culvert extension was completed in six weeks from the time equipment moved in —six weeks ahead of the time limit allowed.

The stone retaining wall of the Pennsylvania Railroad was underpinned in order to build the new retaining wall for the west approach. This was accomplished with a Bucyrus-Erie 30-B Diesel shovel digging alternate entries under the old wall, six feet wide by six feet deep to rock, and then filled with concrete. Then intermediate sections were dug out and filled in the same way. A Monarch tractor came in mighty handy here, as well as later, cleaning up with bulldozer attachment. The old wall of massive ashlar masonry, averaged 35-feet high.

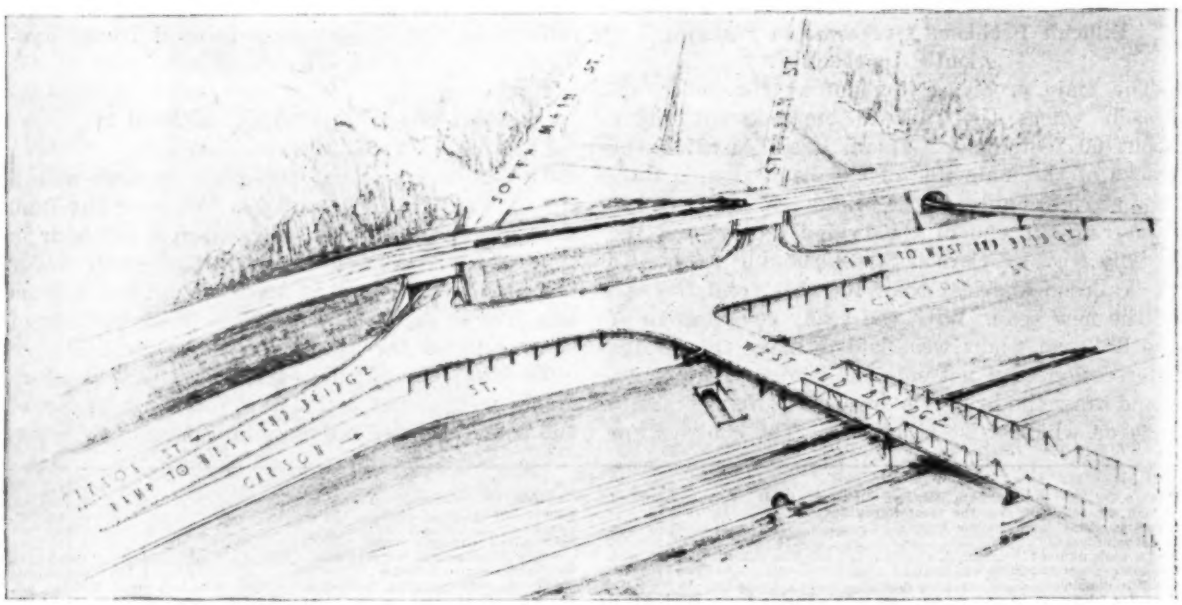
J. K. Elliott, Engineer

The abutment and steel bridge of the Pittsburgh and West Virginia Railroad are to be removed with the 30-B shovel to make way for a new abutment of reinforced concrete and a longer span plate girder steel bridge. It should be noted here that the spur of the P. & W. V. crosses over Carson Street West at a point almost directly above the foot of the west ramp. This spur track goes under the Pennsylvania tracks and across Steuben Street and Saw Mill Run on the south side of sixty-foot embankment of the Pennsylvania Railroad.

The next step was the difficult task of building the 350-foot retaining wall to hold up the fill of the Pennsylvania Railroad in order to widen Carson Street about twenty feet on the south side. This widening was necessary to allow west to east through-traffic on Carson Street to pass the ramps and superstructure without leaving the present street level. This fill has been in place a great many years. The earth is on a 1½ to 1 slope and great care had to be taken in putting in this wall owing to the fact that heavy trains were continually passing on the tracks above. No detail was overlooked in making sure that the fill would not give way while the wall was under construction.

Sheet piling, some 45-feet long, were driven

(Continued on Page 267)

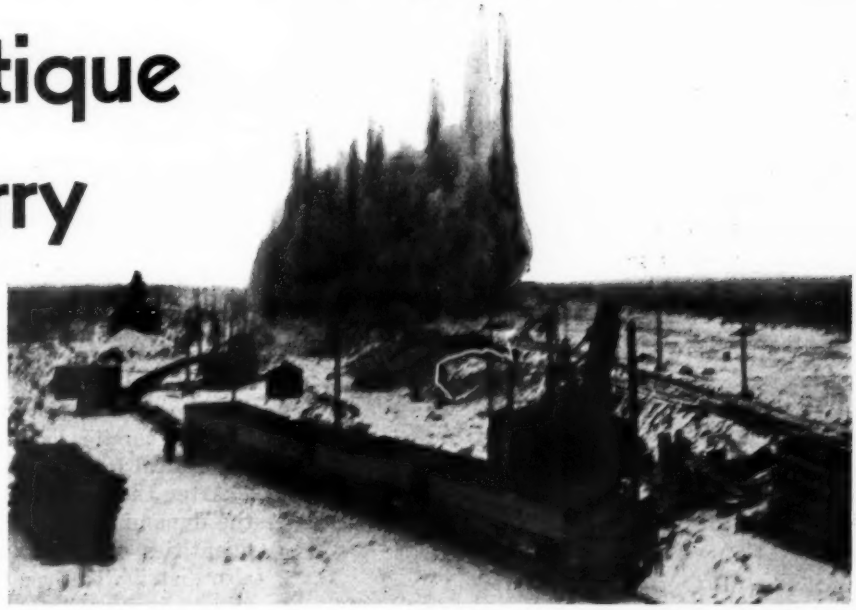


Artist's sketch showing the South approach development of Allegheny County's new West End—North Side Bridge.

Record Breaking Blast at Manistique Quarry

Inland Lime & Stone Co. use 440,966 pounds of dynamite in largest commercial blast on record

By A. J. Cayia
General Superintendent,
Inland Lime and Stone Co.



And the earth trembled in Washington, 1500 miles away.

WHAT is reported by explosives engineers to be the largest commercial blast on record in the United States, was fired March 16, at the limestone quarry* of the Inland Lime and Stone Company, a subsidiary of the Inland Steel Company, about twenty-two miles east of Manistique, Michigan.

The blast resulted in the successful breaking of approximately a year's supply of limestone and proved the engineer's estimates on the economy and effectiveness of a large shot over an extended area.

A total of 440,966 pounds of explosives was fired. The successful firing of a large shot at this quarry last year when more than 313,000 pounds of explosives were used, focused the attention of the quarry management on the effectiveness of large blasts. Under this system, the drilling can be done during the winter season, utilizing the summer operating organization. This allows practically year around employment for the large majority of our employes where normally they would be employed only during the season of navigation.

Over 23½ Miles of Drill Hole

The area drilled covered a space 4,400 feet long by 200 feet wide. Over four hundred 6″ holes were drilled by nine blast hole drills over a period of three and one-half months. The total footage of this was over 125,000 feet. The large number of holes was made necessary by the fact that three track benches were included in this area and closer spacing and greater over depth drilling was required to obtain proper fragmentation.

A survey by explosives engineers of the Hercules Powder Company determined the quantities of explosives needed for each hole and a general plan for the blast was formulated in conjunction with the quarry management. An accurate record of the fragmentation obtained in specific areas by the 1931 blast was the basis for determining the loading factor, the selection of the type and strength of explosive, also the location and amount of deck loads.

INLAND LIME AND STONE COMPANY

PORT INLAND, MICHIGAN

You are being employed on work which is safe if you follow instructions—but dangerous to yourself and others if you disobey orders.

THE FOLLOWING RULES MUST BE STRICTLY ENFORCED. ANY INFRACTIONS WILL BE PUNISHED BY INSTANT DISMISSAL!

1. Smoking or striking of matches are strictly prohibited within the blast area, or where explosives are stored or unloaded.
2. Use no metallic tools of any kind in opening powder boxes. Wooden mallets will be furnished. Do not use any tools in any phase of the work, except those furnished you by your foreman.
3. In stemming holes, care must be exercised to prevent shovels, pails, or any metallic tools from striking against casing protruding from hole.
4. Never start to load a hole unless it has a stake marked with the proper loading.
5. Never charge the second stick unless sounding shows the first stick reached bottom.
6. See that the Cordeau is kept near center of the hole and does not touch casing.
7. Never make a sharp kink in Cordeau.
8. Never leave hole after loading without placing at least 4 feet of stemming on top of charge.
9. Pile all empty powder boxes and covers so they cannot be walked on or fallen over.
10. Return hand tools when finished.

The success of this shot depends in a large measure on the speed and accuracy of loading, so observe all instructions faithfully and inform your foreman promptly if you discover any infractions, for your own safety. Do not talk about the shot away from the job or invite your friends out, as every one will be excluded, from the time loading starts.

NOTE:—Read the above carefully, carry this card with you, and observe it faithfully, that no accidents will happen and that the BLAST may be 100% perfect.

Instructions for safe handling of powder and Cordeau were printed in red on cards slightly larger than this. In spite of wind and cold, a perfect safety record was achieved.

*Note: A complete story describing the operating methods at this quarry was published in The Excavating Engineer for December, 1931.

220½ Tons of Dynamite

The dynamite used in the blast consisted of 216,916 pounds of Hercules Gelamite A in 5x16 cartridges, and 224,050 pounds of Hercules 40 per cent extra L F Gelatin, in 5x16 cartridges. Gelamite is a new type explosives economically doing the work of Gelatin in certain types of blasting. In this instance all holes were at least partly filled with water and although some of the powder was in the holes for eight days the surface indications following the blast seemed to indicate complete and successful detonation.

Due to the shot being loaded in winter weather and the difficulty experienced with sand stemming last year, it was decided to use minus one-half inch crushed limestone. More than forty carloads of this material was required and the ease of handling

The Bucyrus-Erie 170-B's will have easy going in this well shattered bank.

and free running qualities considerably reduced the time required to stem the holes, and more than justified its choice.

One Week to Load

Distribution of explosives over the area began Sunday, March 6. The actual loading started Tuesday morning, March 8th. The bench holes were loaded first and by Thursday night 1,300 holes had been loaded and 112,000 pounds of dynamite had been placed in the ground, complete with stemming. By Saturday night, March 12th, 2,700 holes had been completed with a total of 275,000 pounds of powder in the ground. On Tuesday, March 15, at noon, the complete blast, or 4,031 holes had been loaded and stemmed.

Tuesday afternoon was devoted to cleaning the area of empty boxes and stripping the Cordeau at each hole, making ready for connecting the next day. The Cordeau hook-up was started at 7:30 on Wednesday morning and forty-four workmen completely hooked up the blast in four and one-half hours, including the first inspection. The second and final inspection was made between the hours of one and two and the blast was fired at 3:02 P. M.

How the Loading Was Handled

The loading operation was thoroughly organized to the end that the charges be accurately placed as to quantity and at proper depth. Previous to starting the loading, all holes were sounded and from tables previously prepared the charge for each hole was determined according to depth and spacing. This charge in terms of number of sticks of each kind of dynamite was written on a linen tag and placed at the hole. The depth of the hole was also marked on the tag as was also an identifying letter corresponding to the nine arbitrary sections into which the quarry had been divided. When the loading of a hole was completed this tag was turned in to the office. Its letter identified the section and was used daily to keep an account of the progress of the loading and also to check the total dynamite loaded in a section against the theoretical loading computed.

After the sounding of the holes was completed the dynamite was distributed to each hole in the quantities called for on the tag. Stemming was also distributed over the area in sufficient quantities to insure the stemming being completed immediately after the charge was loaded.

The men engaged in the preparation and loading were given a printed card containing general and specific rules for safety in this work. Also detail instructions for the placing of the powder and Cordeau. A facsimile of the card is printed herewith. On the reverse side SAFETY FIRST was printed in large red type.

When all preliminaries were completed several loading crews were started. Their routine was:—First sound the hole to be loaded and if the depth did not coincide with the depth on the tag, mark the hole, report it to the foreman and move to the next one. If the depth checked the Cordeau was laced through the first stick and lowered into the hole. The wooden tamping pole was then in-

Looking over the drilled area during the loading of the holes.

serted to determine if the first stick reached the bottom. If it did not the foreman was called and took the necessary approved methods to get it to the proper depth before any more dynamite was

(Continued on page 245)

Connolly Contracting Company's Operations on West Neebish Channel

(Continued from Page 237)

Two Caterpillar Sixtys, one of them with a La Plant-Choate Bulldozer, are handy men around the job. Also there are three Ford Service cars and one 12-foot blade used in keeping up the roads.

In addition to the drill sharpening shop there is an excellently equipped machine shop, blacksmith shop and garage.

Passenger Steamer Makes Delux Camp

The camp is about the neatest thing a contractor ever dreamed about. When he secured the job Mr. Connolly purchased the passenger steamer "Indiana" which, because of some dry rot in the hull, had been condemned by the authorities as unsafe for further passenger service except with extensive repairs. The boat was repaired and rebuilt for use as a combination camp and power plant and gives excellent service for both.

The steam boilers of the Indiana, through steam turbines, drive one 500 K.W. and one 625 K.W. Westinghouse generators. These furnish electric lights and power for the entire job and save the excessive cost which would have been necessary in running power lines from Sault Sainte Marie.

The excellent passenger accommodations of the ship make a most luxurious camp for the employees. There are private state rooms with double deck bunks and running water. The main salon with its grand piano, comfortable chairs and convenient tables makes a most pleasant recreation room. The ship's dining room is used for serving the meals and the kitchens for their preparation. Meals are served in cafeteria style and are excellent in quality and quantity.

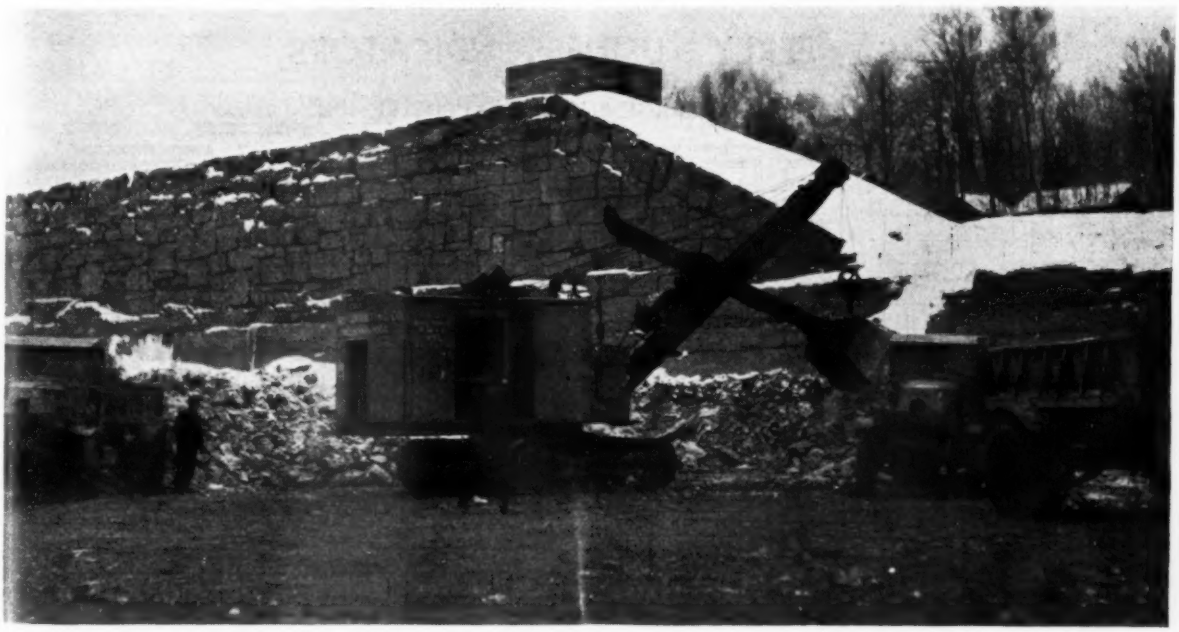
This 3½-yard Marion dragline with 125-foot boom casts the rock directly into the spoil pile on the bank. Output is about 25,000 yards per month for double shift operation. The spoil pile will have to be leveled off later.

Aft on the lower deck are the offices and the commissary which is liberally stocked with about everything that a camp commissary might be expected to carry including ice cream, soft drinks, and magazines.

Few Accidents in Spite of Hazards

A large and excellently equipped first aid room is on the upper deck in charge of Miss Connolly, nurse, but because of the safety precautions taken

(Continued on Page 245)



Note the level floor left by these Gas+Airs. Also the wide cat carried. Trucks are carefully spotted to permit dumping at the radius at which the dipper leaves the bank.

THE EXCAVATING ENGINEER
FOUNDED 1905

A Monthly Publication Devoted to Excavating and Allied Subjects

REGULAR SUBSCRIPTION: $1.00 a year for 12 months.
SPECIAL SUBSCRIPTION: Upon application on card inserted in this number, The Excavating Engineer will be sent frequently (not regularly) free of charge. Only for those engaged in the industry of excavation.

THE EXCAVATING ENGINEER PUBLISHING CO.
F. O. Wyse, Managing Editor—Arnold Andrews, Editor
E. M. Heuston, Advertising Manager.
South Milwaukee, Wisconsin
Printed in U. S. A.

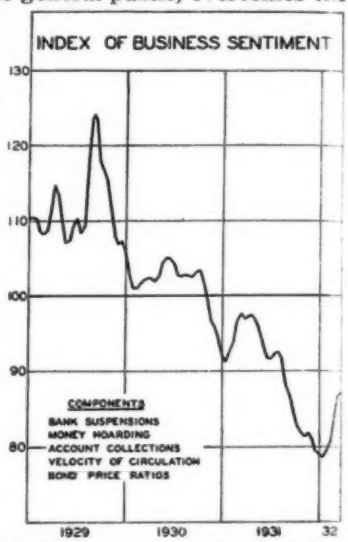
The Business Situation

THERE is considerable irony in the present situation. While there are a few rather definitely hindering features of the present world-wide situation, the main difficulty seems to be the lack of confidence.

Thus we have the rather ironical anomaly of the business world anxiously seeking acceleration of business and at the same time hindering such development by their lack of confidence.

The most definite unfavorable factors are the high tariff walls that the various nations have placed around their borders and the approaching reconsideration of the International Debt Moratorium but even this latter holds some promise for if a plan were evolved which would strengthen the credit of Germany and put her industries on a better operating basis, it might well prove to be the most important step toward ending the depression.

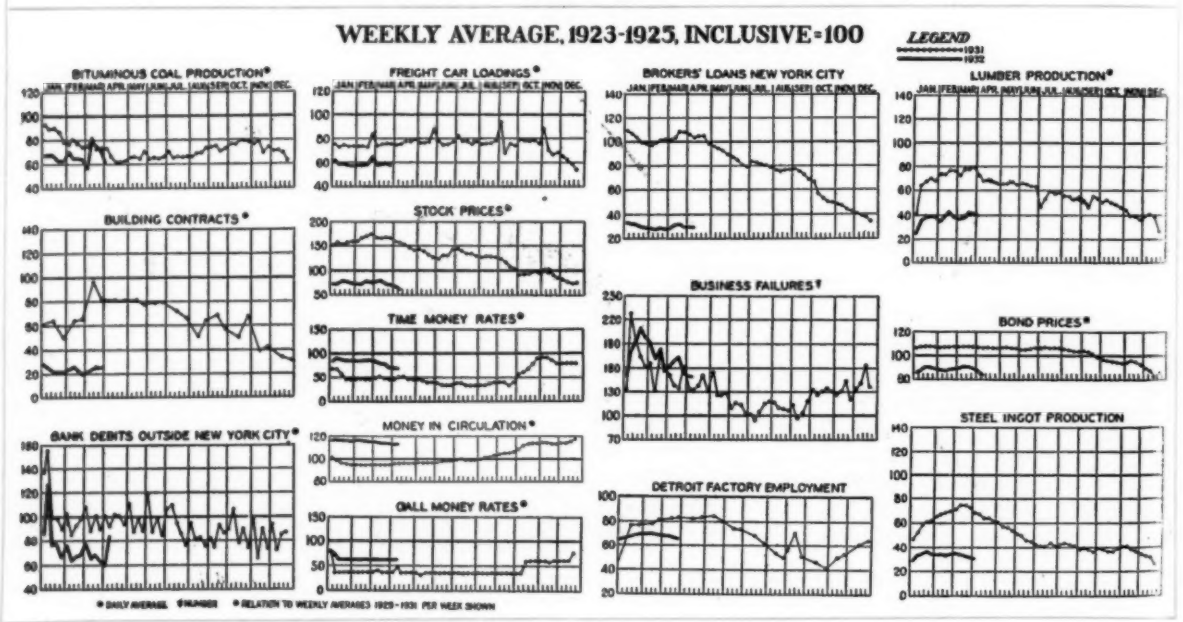
Of utmost importance is the great improvement of financial conditions in our own country that has been made in the past few months. Bank suspensions have been reduced almost to the vanishing point and the hoarded money, which was such a weight to the business world a few months ago, has been put back into normal economic channels at an amazingly fast rate. In the chart showing money in circulation the drop since the first of February represents a return to the banks of some one hundred and fifty-one million dollars. Both these factors are very favorable since they definitely establish better credit conditions which the business man may take advantage of as soon as he, and his brother—the general public, overcomes the unusual lack of confidence. Automobile manufacturers are making a concerted drive for new business — particularly with the lower priced model. Such action may be of decided help in restoring confidence.



During the last few months we have heard more about business sentiment than almost any other subject closely allied with business conditions. This most important factor is the most difficult one to appraise definitely enough to plot with any degree of accuracy. Great indices cannot be reached by any direct method. The best attempt we have seen to construct an index reflecting changes in business sentiment has produced the diagram shown above

(Continued on page 266)

WEEKLY BUSINESS INDICATORS



Record Breaking Blast at Manistique Quarry

(Continued from Page 242)

added. After the first stick was properly placed the balance of the dynamite was dropped a stick at a time and rammed home with the wooden pole, and held in place until the charge had been stemmed with approximately three feet of fine rock stemming to prevent the charge from being displaced by water pressure or any other cause. The loading crew then proceeded to the next hole. A stemming crew followed closely and completed the stemming.

Any holes not to proper depth were re-entered by a drill kept on the blast area for that purpose, and cleaned out. A special crew of loaders then loaded these odd holes.

The Cordeau used in each hole and in connecting all holes required 143,563 feet of double countered and 55,710 feet of plain, a total of 199,372 feet or about 38 miles.

Not a Single Lost Time Accident

The shot was worthy of comment from a safety standpoint in the fact that there was not a single lost time accident among the seventy odd employes of the Inland Lime and Stone Company and the several Hercules explosives engineers during the unloading of the powder, its distribution, and loading of the holes. This perfect safety record was particularly commendable by reason of the fact that the worst weather of any time in the winter in the shape of high winds and biting cold was experienced during the nine days in which the shot was being loaded and connected. Among all the employes assisting in the loading, there was no report of a powder headache.

Seismographs Record Shock 1500 Miles Away

Because of the size of the blast, it incurred wide popular interest and representatives of three news reel companies were at the quarry securing talking pictures. The United States Bureau of Mines was represented, as was the United States Coast and Geodetic Survey. While the shock from the explosion was scarcely noticeable at any distance immediately removed from the quarry, earth tremors naturally occurred, which could be picked up by geophysical apparatus. In order to aid seismological stations in measuring the vibrations through the underground structure, the exact time of the explosion was noted, using time signals by radio from Washington. Seismographic records of the earth tremors were obtained at Buffalo, N. Y., Madison, Wis., East Lansing, Mich., and at Georgetown University, Washington, D. C., the latter about 1500 miles air line from Manistique, Mich.

Various officials of the Inland Lime and Stone Company and its parent company, the Inland Steel Company of Chicago, witnessed the blast. W. J. Reese and C. D. Peacock were Hercules explosives engineers on the job, and A. J. Cayia, General Superintendent of the Inland Lime and Stone Company had charge of the operations.

Connolly Contracting Company's Operations on West Neebish Channel

(Continued from Page 243)

A row of summer resort cottages alongside the channel and near the lower coffer dam were taken over for use of the men with families. This one is occupied by Superintendent McKee. Mr. and Mrs. McKee and guest on the porch.

on the job it has had comparatively little use in spite of the twenty-four hour operation and the dangerous character of the work. There had been very few accidents, three broken legs having been the total of the serious accidents at the time of our visit.

While the contractor has until December, 1932 to finish the dry excavation, after which he is permitted additional time for the removal of the coffer dams, Connolly Contracting Company expects to be ready to take the dams out in June. This will permit the use of the channel for this season's navigation and will actually mean practically a year of advance use.

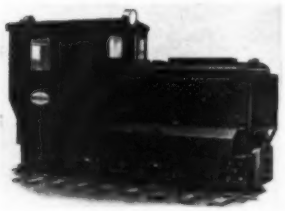
Work is under the general supervision of President P. L. Connolly, although having other jobs under way, (including a large dam at Joliet, Illinois) and still others in prospect he has been unable to give more than a portion of his time to the West Neebish job. J. S. McKee is Superintendent. Mark Madigan is in general charge of shovels and trucks. Excavating operations are in charge of foreman Bill Kirchoff and Lawrence Kowalska, drilling under drill foreman John Kuusisto; shops under Lewis Schultz and Vince Egan. Commissary and camp are supervised by N. O'Brien.

In charge of the government engineers on the West Neebish work are Kenneth Heagy, Junior Engineer, F. C. Scrivener and Roy Green, chief inspectors. The project is under the direction of the U. S. Engineers Corps with Major D. McCoach Jr. contracting officer.

EQUIPMENT YOU OUGHT TO KNOW ABOUT

New Diesel Locomotive

THE *Fate-Root-Heath Co. (Plymouth Locomotive Works), Plymouth, Ohio,* has added three new models of Diesel locomotives to their already extensive line. These three new locomotives will be known as Model FLD 6-ton equipped with a 3-cylinder 36-h. p. engine; DLD 8-ton equipped with a 4-cylinder 48-h. p. engine, and DLD 10-ton equipped with a 6-cylinder 72-h. p. engine.



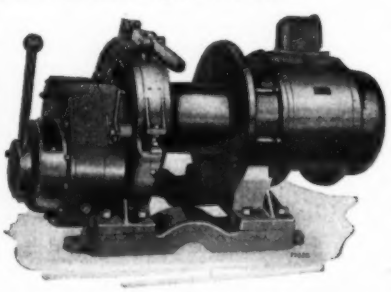
These locomotives are equipped with Cummins Diesel engines similar to the one that made the remarkable 500-mile non-stop run on the Indianapolis Speedway May 30th, 1931, at an average speed of 86 miles per hour and a fuel cost of $1.78. Another remarkable record of this engine was the coast-to-coast trip of a truck which weighed 16,000 lbs. traveling 3,214 miles in 97 hours 20 minutes at a fuel cost of $11.22.

The first Model FLD 6-ton Plymouth locomotive had been in service for several months with a large lumber company where it is hauling 778 loaded cars and 229 empty cars in 65 hours at a total fuel cost of $2.00 or 25 cents per eight-hour day.

Plymouth Diesel Locomotives are now available in all sizes from 6 to 80 tons making it possible for practically any haulage problem to be solved. Full description of these new models will be sent on request. Please mention *Excavating Engineer* when writing.

New Electric Portable Hoist

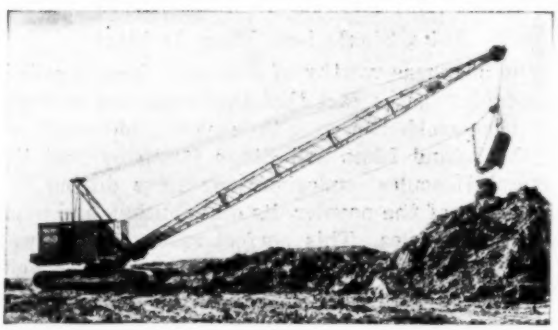
A NON-REVERSIBLE, single-drum electric hoist designed for many applications in the mining, contracting, and industrial fields has been added to its line of portable hoists by *Ingersoll-Rand Company,* 11 Broadway, New York. It is modeled after company's "Utility" hoists, except that it uses an electric motor and friction clutch instead of an air motor and a jaw clutch.



The new hoist is suitable for all single cable work within its capacity such as hoisting timbers, muck, tools, and pipe, hauling and spotting cars, and for single-line scraping. It is made in two sizes. No. 107 is of 7½ h.p. and rated at 2,000 pounds pull at 125 feet per minute. It has drum capacity for 400 ft. of ½-inch or 700 ft. of ⅜-inch cable. No. 107L is of like power, but has drum capacity for 800 ft. of ½-inch or 1,400 ft. of ⅜-inch cable. No. 110 has a 10-h.p. motor and is rated at 2,000 pounds pull at 165 ft. per minute. The drum capacity is the same as for the No. 107. No. 110L has the same power as the No. 110 and the same drum capacity as the No. 107L.

These new hoists are simple, rugged, and compact, are easily operated, have smooth control, and graduation of speed. They have a self-energizing brake for stopping and holding the load and an automatic safety drum lock for added safety when handling suspended loads. Moving parts are protected by dust-proof construction. Bases are drilled and grooved for either column mounting or bolting to a flat surface. Either A. C. or D. C. motors can be furnished.

New Dragline Announced by Bucyrus-Erie



THE NEW 45-B recently introduced by Bucyrus-Erie is a special machine for dragline work. One of its outstanding features is the long, tapered caterpillar-type mounting which enables it to work on and cross soft ground easily and without nosing in. These cats are 19 feet 6 inches long and in design follow closely the type used on the Class 9½ dragline which is noted among old timers in the dragline business for having one of the most successful dragline mountings ever built. The new mounting gives lowest ground pressures, has high clearance under the frame, and propels easily even in heavy, sticky mud.

The 45-B may be equipped with a 2 to 2¼-yard bucket (depending on the weight of the bucket, the material being handled, and the working radius) and 50-foot boom or a 1¼ to 1½-yard bucket on a 65-foot boom; booms may be had up to 80 feet long. It is equipped with a 155-horsepower, six-cylinder gasoline engine and ratings show unusually high speed and line pulls. The boom is of strong but light-weight design and is built of alloy steel. The machine steers like a tractor, through clutches controlled by a lever at the operator's side, it makes sharp or gradual turns with the cab in any position.

This new dragline has large fairlead sheaves that cut down rope wear. It is not convertible to a shovel though it may readily be used for clamshell or crane service. It is only necessary to remove boom and A-Frame to ship on most U. S. railroads.

Readers may obtain further information by writing to *Bucyrus-Erie Company, South Milwaukee, Wisconsin,* and mentioning this magazine.

(This Section is Continued on Page 262)

ALWAYS A FULL LOAD WITH A BLAW-KNOX DIGGING BUCKET

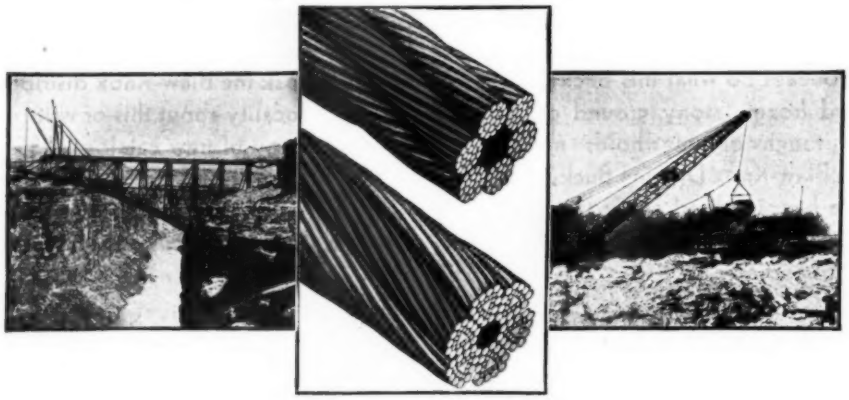
Will your bucket do what this bucket does? Hard frozen, stony ground or any other tough digging holds no terrors for a Blaw-Knox Digging Bucket —it grabs a heaping load every time. It will *outdig* any other bucket of equal weight and size.

Ask the Blaw-Knox distributor in your locality about this or write us direct for copy of new catalog 1339 describing and illustrating clamshell buckets for every use and having a handy chart enabling you to select just the bucket to fit your need.

BLAW-KNOX COMPANY — Farmers Bank Building — PITTSBURGH

BLAW-KNOX

For your convenience in writing to Blaw-Knox Company, you will find a card bound in this issue.



Hercules (Red-Strand) Wire Rope
Is a Time and Money Saver

It is a well known fact that a lot of time and money are spent every time a worn out wire rope has to be replaced.

"HERCULES" (Red-Strand) Wire Rope is exceptionally long-lasting because it is made of acid open-hearth steel wire, which is first rigidly tested by us to make sure that it meets our exacting standards. Any wire that falls short of our requirements is promptly rejected. The accepted wire is then made into rope according to our own exclusive manufacturing methods.

There are many other reasons why "HERCULES" (Red-Strand) Wire Rope is able to withstand so much wear and tear — but results are what count, and we therefore submit for your consideration the long service record of this wire rope. Do not hesitate to try it on your hardest work. We also recommend it for jobs where the margin of profit is small as it helps to stabilize operating costs. We shall be glad to send you a copy of our catalog. We also want you to feel free to write us about any wire rope problems that you may have.

1857 – 1932
75th ANNIVERSARY
A. LESCHEN & SONS ROPE CO.

Furnished in both "Patent Flattened Strand" and "Round Strand" constructions in order to meet all working conditions.

Made only by **A. Leschen & Sons Rope Co.** Established 1857

5909 Kennerly Avenue
ST. LOUIS, MO.

New York - - - - 90 West Street
Chicago - 810 W. Washington Blvd.
Denver - - - - 1554 Wazee Street
San Francisco . 520 Fourth Street

For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

SHOTS FROM THE FIRING LINE

Alaskan Highway to Cost Over 14 Millions

THE PROPOSED Pacific highway from Blaine, Washington, to Fairbanks, Alaska, opening up the interior of Alaska to both Canadian and United States commerce, will cost $14,300,000, according to Ernest W. Sawyer, member of the international highway commission.

Mr. Sawyer, who recently returned from a survey of the territory through which it will run, reports that it will open up 370,000,000 acres of land along its 2,225-mile course. The highway is completed from Blaine to Hazleton, B. C., but from that point onward the road must be built through virgin territory.

Project Investment in Federal Roads

"ALTHOUGH the need for jobs is a prime factor in the continuation of Federal Aid to states in roadbuilding at least on its present scale, it must not be forgotten that a large, economically needed, roadbuilding job still remains to be done." This declaration was made recently by Frederic E. Everett, President of the American Association of State Highway Officials.

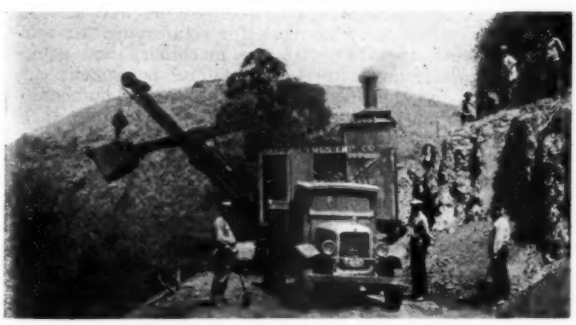
"Of the 197,000 miles on the Federal Aid system only 76,300 miles have high type surfaces," Mr. Everett pointed out. "Some 14,500 miles on the system have received no attention whatsoever and 28,850 miles are still in the graded and drained stage. An additional 57,800 miles have only low type surfaces and 19,400 miles have intermediate type surfaces.

"On the one hand the task ahead assumes astounding proportions. On the other, it is evident that excellent progress has been made, doubly so when it is considered that thousands of miles of roads not classified as high type pavements are roads technically known as stage construction. This stage construction, or preparatory work, will enable the Federal government and the states to proceed at a gait much more rapid than was possible during the first few years of Federal Aid.

"In 1931 approximately 11,000 miles of Federal Aid highways were improved. That is good progress and in view of the importance of highway transportation to every citizen, it is necessary that this rate be maintained."

Chile Notes

By W. SLUTTER



The above illustration shows the Bucyrus-Erie B-3 steam shovel owned by the Compania Constructora del Pacifico (which is the construction department of the Compania Chilena de Electricidad) operating on the road between Laguna Verde and Valparaiso.

Alaska Notes

CHARLES H. HOLMES

Charles H. Holmes, Chief Engineer of the Alaska Railroad, died at Anchorage, Alaska, on April 9. Mr. Holmes was a native of Lexington, Kentucky, and a graduate of the Military Academy at West Point. He had entered the employ of the Alaska Railroad in 1915 as general foreman of bridging and building. He became bridge engineer, chief engineer, and was at one time the acting general manager of the Road.

Surviving are a wife and two daughters, aged five and 12 years. Mr. Holmes had worked in his office all morning and died of a sudden stroke in the office of Colonel Otto F. Ohlson, the General Manager of the Road.

Spanish Morocco

By D. H. MARLOW

This Bucyrus-Erie Type 1030 ¾-cubic-yard electric shovel operates in the mine of the important Spanish iron mining company, **Minas de Setolazar.** In spite of the hard going, M. Charles F. de Caleya states that this small shovel has done excellent work, and its output has been most satisfactory.

New Jersey Notes

The New Jersey Contractor's Association conservatively estimates that 76 cents of every dollar spent for road work goes into the pockets of workmen. Of this portion, 34 cents is paid to labor directly on the project and 42 cents indirectly through the various items connected with transportation and the manufacture of supplies and equipment. It is estimated that of every dollar spent for freight, labor receives a total of 62 cents. Crushed stone, largely used in New Jersey in building concrete pavement, contributes nearly 87 cents of every dollar to labor. Labor connected with the manufacture of cement receives 73 cents of the dollar spent for this material by the contractor.

Some 40,000 men in New Jersey had jobs last year because of the highway improvement program. The Association points out that to lessen highway work the state would not only have to take care of more unemployed men and their families, but also would fail to take advantage of the extremely low construction prices now prevailing.

Delaware Notes

The Oldline Construction Company of Chestertown, Maryland, with a bid of $17,483.00 were awarded the contract for excavating 9900 cubic yards of material on the 3.361 miles from Dublin Hill to Jacob's X Roads.

Union Paving Company of Philadelphia, with their bid of $131,164.00 were low bidders on the 4.318 miles from Fieldsboro to Drawyers. This contract consisted of 13,000 cubic yards of excavation, 11,800 cubic yards of concrete pavement and various other items.

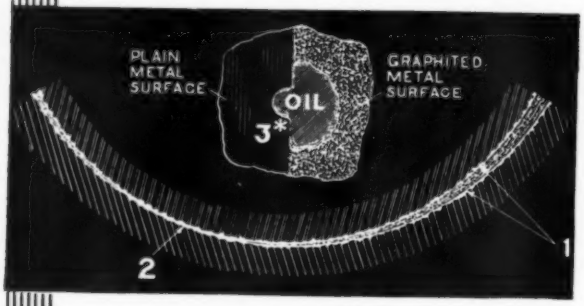
The 4.8 miles from Bryan's Store to Hardscrabble consisting of 28,110 cubic yards of excavation and borrow was awarded to the **Old Line Construction Company** of Chestertown, Maryland, with their bid of $87,000.00.

Irving V. A. Huie of Saugerties, New York, with his bid of $59,695.00 was awarded the contract for excavating

THIS IS THE REASON

GREDAG

INSURES LUBRICATION



1 GREDAG, a blend of high quality grease and Acheson electric furnace graphite, develops highly polished bearing surfaces, with PURE graphite equalizing the microscopic irregularities of the metal surfaces.

2 These graphitic surfaces carry the bearing load, prevent destructive metal-to-metal contact and afford low starting friction should the grease film break during prolonged periods of rest.

3 The remarkable affinity of Acheson graphite for grease and oil—7 to 10 times that of plain metal—establishes a firmly adhering film of grease lubrication on every element of the bearing surfaces with the first revolution.

This film resists pressure, heat and water. It withstands slow speeds and heavy shocks. It prevents rust on water-cooled or weather-exposed bearings.

★ **TRY THIS SIMPLE EXPERIMENT** on a smooth metal surface with a lead pencil and a drop of oil. It demonstrates the reason for the superiority of Gredag Lubrication.

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division
CLEVELAND, OHIO
Unit of Union Carbide UCC and Carbon Corporation

Branch Sales Offices
NEW YORK PITTSBURGH CHICAGO SAN FRANCISCO

Shots From the Firing Line — *Continued*

11,000 cubic yards on the 4.380 miles from Fisher's School to Farmington. There were also other miscellaneous items in this contract.

Virginia Notes

BY M. L. HATCH

The Virginia State Highway Department has recently taken over the control and responsibility of all county roads as well as the State highway system. This, coupled with the fact that certain Federal laws relating to inducted labor eliminate the possibility of using convict labor on Federal Aid projects, should develop a favorable situation wherein the basic highway system will have to be completed and further developed under contract. It is probable that the Department will confine its individual road building activities in the future to feeder county roads and release a reasonable size program in which various contractors can compete.

At this writing officials of the Highway Department are deep in the matter of re-organization to take care of the increased burden, consequently nothing definite is known. The outcome of this re-organization, as soon as it is known, will be published.

Buffalo and Vicinity

By D. E. WHITE

The New York State Construction Council, composed of contractors, sand and gravel owners, quarry operators, cement men, as well as machinery and equipment dealers, are planning on a concentrated drive here in the State of New York for an increased roadbuilding program.

At the last session of the New York Legislature the highway budget was reduced to around 355 miles. The previous year, 1931, there was approximately $71,000,000 raised through special taxes on motorists consisting of gasoline taxes and license fees and there was, approximately, 1,000 miles in construction and reconstruction, as well as maintenance work. The year of 1932 with the increased gasoline tax and motor truck tax, it is estimated will bring in the sum of approximately $92,000,000, while highway program as mentioned previously, only provides for about one-third of the number of miles that we had in 1931.

This reduction, in the minds of men and industry who are doing, and furnishing material for, highway construction, will throw out of work approximately 3,000 men this year. If such is the case, it is a poor way of alleviating the unemployment situation in the state.

The thought behind this program is that if the special session of the Legislature can be called and an emergency bill rushed through whereby they will provide for at least as many miles of roadwork this coming year as we had in the past, it will do a great deal to help overcome the unemployment situation in the state. In fact, it is estimated that should this emergency bill be created, labor as well as industry in many different lines will be benefited including railroads who will get their share of hauling cement and aggregates; as well as reinforcing steel for highway and bridge work; also trucks will do likewise, as well as steel plants, who will make wire mesh for reinforcing for reinforced concrete, together with the machinery and equipment men who manufacture roadbuilding equipment.

It will also be the means of keeping a larg number of engineers who are employed by the state, who, unless there is more state roadwork, will be out of employment.

Practically all progressive organizations are aiding in the attempt to call this special session of the Legislature so that the greatest number of people may be benefited by this program.

The contract for first phases of grade crossing elimination projects to be undertaken by the Erie Railroad has been awarded to **H. E. Culbertson Company,** Cleveland. This contract is for work at Elmira, N. Y. The initial step will be the reconstruction of the Erie Railroad roundhouse, the rearrangement of yard tracks and elevation of the Washington Avenue Bridge.

We also understand that the D. L. & W. R. R. will start work at Elmira at an early date, and supplies for the

For your convenience in writing to National Carbon Company, Inc., you will find a card bound in this issue.

"Caterpillar" TRACTORS

•PUSH •PULL

•LIFT •DRIVE

Built in seven sizes—a size for every use and a hundred uses for every size.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Track-type Tractors Combines Road Machinery

(There's a "Caterpillar" Dealer Near You)

Prices—f. o. b. Peoria, Illinois

FIFTEEN	$1100	THIRTY-FIVE	$2400
TWENTY	$1450	FIFTY	$3675
TWENTY-FIVE	$1900	SIXTY-FIVE	$4350
DIESEL	$6500		

For your convenience in writing to Caterpillar Tractor Co., you will find a card bound in this issue.

Shots From the Firing Line — *Continued*

construction of temporary track systems are now being delivered. Contract awards for this work, however, have not yet been announced.

Pittsburgh and Vicinity

By J. S. WEAVER

Secretary of Highways Lewis has awarded the contract for building a new bridge over Kiskiminetas River between Vandergrift Borough and Parks Township, Armstrong and Westmoreland Counties, to the **Highway Construction Company, Cleveland.** The entire cost of the new bridge will be paid by the State of Pennsylvania. A 50-foot, three-span bridge will be built.

Improvement this spring of 7.4 miles of unimproved road on the Connellsville to Farmington highway, frequently described as "the Alps," has been approved by Governor Pinchot, it was announced some few days ago by William J. Burchinal of Uniontown, a member of the state workmen's compensation board. It is believed the highway, a Federal Aid job, will be built of concrete, giving a primary route from Uniontown to the National Pike at Farmington. The route has been surveyed several times, but Government approval was held up, it is said, by a grade near Ohiopyle. The unimproved stretch lies between Mill Run and Ohiopyle.

Clyde Hatton, Du Bois, Pennsylvania, has a Bucyrus-Erie Gas+Air shovel working on state highway work near New Millport. The shovel is being operated by Lester Reighart.

Contract plans for completion of the Mt. Washington roadway extension project are more than 95 per cent complete, Chief Engineer Charles M. Reppert of the City Public Works Department, told the Council some few days ago. Under the proposed arrangements the city will pay the railroad company $100,000. The contract ordinance and other legislation in connection with the improvement, the estimated total cost of which is $900,000, have already been passed. It is expected that bids will be asked for this project in the very near future.

The contract for paving Penn Avenue, Seventh Street to Ninth Street, Pittsburgh, has been awarded to the **R. D. Thomas Company.** The above have also been awarded the contract to widen and pave Seventh Avenue between Grant Street and William Penn Way. Work will be started within the next two weeks and rushed to completion.

The Vang Construction Company has been awarded the contract for the construction of the Pottsville Water Company reservoir, to be built about four miles from Pottsville on the Frackville Road. N. J. Beisel is chief engineer for the water company.

Completion of the Perry highway project through Conneaut Swamp, near Meadville, was ordered by Secretary of Highways Samuel S. Lewis. The work will require 50,000 cubic yards of additional fill and construction of 200 feet of trestle work. Work on this section ceased more than a year ago after thousands of yards of fill had sunk into the apparently bottomless swamp. Three engineers, F. R. Layng, chief engineer of the Bessemer & Lake Erie railroad; C. A. Burn of the New Jersey state highway department, and Charles F. Boehler of the Michigan state highway department, recommended continuation of the project on the route laid out by the state highway department engineers. Secretary Lewis said the work would be resumed as soon as a contract is awarded. The plans call for construction of two wooden trestles with 30-foot roadways and one sidewalk.

After many delays, representatives of the city transit commission and public works department have begun a survey of the **proposed downtown subway loop** with assurance from Norman F. Brown, advisory engineer of the plan, that construction if started now can be completed within the appropriations of the ratified $6,000,000 bond issue and with the guarantee that work will be offered to 1,000 for at least a year.

Council President John S. Herron, co-sponsor of the subway proposal, stated he expected the survey to be completed and recommendations ready for council's attention within the next few weeks. The conferees also have begun a survey of the proposed Allegheny River wharf walls, designed as parking spaces and improved river landings between Stanwix and Ninth Streets; this will also provide dumping ground for material from the subway excavations. Mr. Reppert stated he had the plans under consideration and would arrange a conference with Government engineers. This plan, estimated to cost approximately $600,000, was also submitted by Mr. Snodgrass as an employment relief measure.

The advertisement for bids for the **construction of the Girtys Run sewer project** is expected to be asked about May 1. This project consists of six miles of 18 to 30-inch sewer and is estimated to cost $220,000. The sewer will jointly serve four communities: West View Borough, Midvale Borough and Ross and Shaler townships. The engineers for Shaler Township, F. G. Ross; H. P. McKown for West View; McCully Engineering Co. for Ross Township, and S. H. Burns for Midvale Borough.

BULL-DOG

ROPE SOCKETS, carefully designed so that the rope pulls are directly in line with the point of attachment, insure longer life to wire ropes.

They are the SAFEST, QUICKEST and MOST CONVENIENT way of attaching wire rope, can be attached by unskilled labor — and THEY NEVER LET GO.

WRITE FOR BULLETIN S-10

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

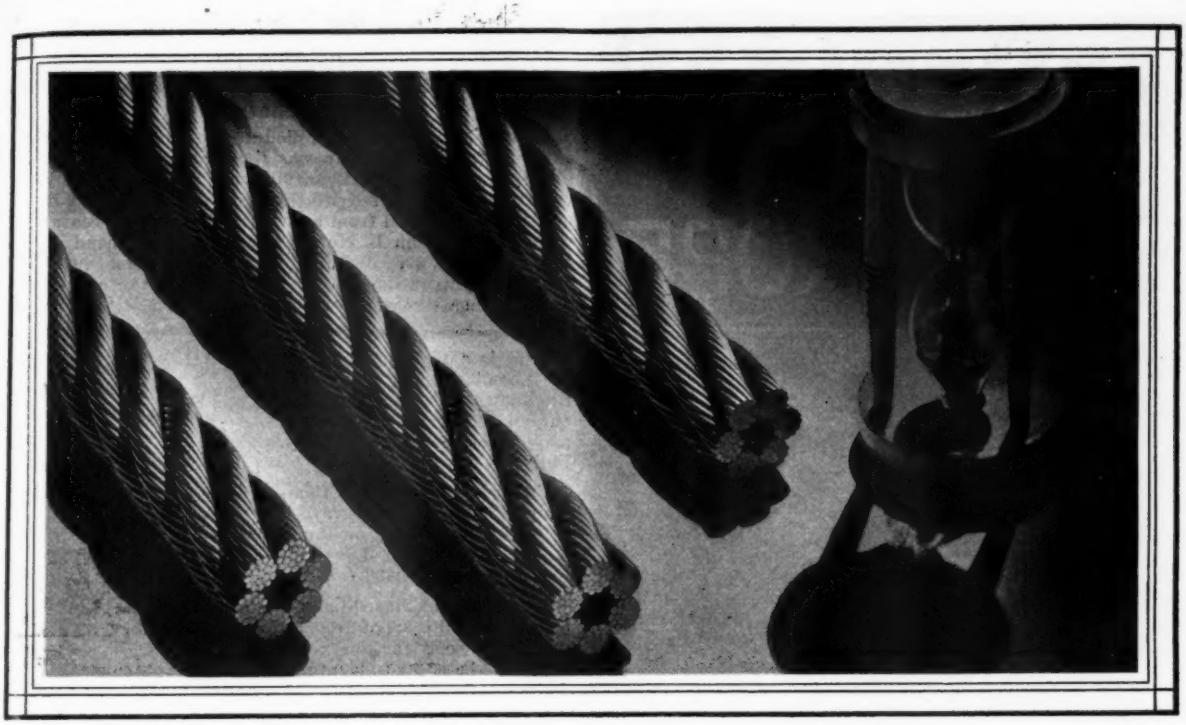
SPECIALTY DEPARTMENT

SOUTH MILWAUKEE • • • WISCONSIN

JOHN J. DOYLE

John J. Doyle, president of the J. and M. Doyle Construction Company, Erie, Pennsylvania, paving contractors, died in his home, 457 West Third Street, that city, on Sunday, April 3, of pneumonia. Ill only three days, Mr. Doyle was stricken with his fatal illness shortly after his return from Florida, where he and his family had spent the winter. Mr. Doyle was the son of the late Patrick and Bridget Doyle, pioneer residents of Erie. He was one of a large family. Son of a contractor, he continued in the steps of his father from an early age and several years ago organized the J. and M. Doyle Company, of which he has always been president. It had branched out into one of the largest of the local roadbuilding concerns and besides doing a major part of the street work in Erie during the past fifteen years had completed many large state highway projects in Ohio, Pennsylvania and New York states. Mr. Doyle is survived by his widow, two sons and the following brothers and sisters: William P., Charles and Harry, Mrs. James P. Whitby and Mrs. Cora Doyle, all of Erie.

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue



What is the *True* MEASURE of Wire Rope service?

Variations in rope life are experienced by practically every rope user. Ropes encounter varying service circumstances. Operating conditions, as well as rope maintenance and equipment conditions, change from time to time, even on the same piece of equipment. As a result, rope life varies too.

It is easy, therefore, to see why the service given by a single rope is not necessarily a criterion of the *general* service that make or design of rope will provide.

Many years of experience and close contact with thousands of diversified installations of wire rope have convinced this company that there is only one fair and reliable basis on which to compare the service of wire ropes:—the basis of *average* service.

Roebling is glad to have its ropes put to this severe test. It advocates the "Average Service" method of determining rope cost, in which cost per ton of material handled, mile traveled, or other measuring unit, is based not merely on the service of a single rope but on the *average* service of several ropes.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.

Wire · Wire Rope · Copper & Insulated Wires & Cables · Welding Wire · Flat Wire · Wire Cloth & Wire Netting

Branches in Principal Cities Export Dept.—New York, N.Y.

A plain statement about Wire Rope Economy

Roebling does not indulge in nor encourage sweeping claims of superior wire rope economy. Such claims, if generally made, would merely confuse the rope user. ¶ For the guidance of rope buyers, however, Roebling does assert that when gauged by the work performed, NO wire rope, regardless of make or construction, will show lower general average operating costs than Roebling.

Wire Rope for all purposes

There is no such thing as a wire rope "cure-all". No one design of wire rope is suitable for all purposes. ¶ Roebling makes wire rope of a great variety of types and constructions, and therefore can supply a wire rope exactly suited to each particular requirement. ¶ The great stamina of all Roebling Ropes is primarily due to the quality of Roebling Wire. This Acid Steel Wire is renowned for its fatigue and wearing qualities. No better rope wire is produced. ¶ "BLUE CENTER" STEEL is the highest grade and is generally recommended for severe duty.

JOHN A. ROEBLING'S SONS COMPANY

For your convenience in writing to John A. Roebling's Sons Co., you will find a card bound in this issue.

AMERICAN
STEEL & WIRE COMPANY
WIRE ROPE

ON shovels—on derricks—brute force is necessary to loosen and load rock—mighty strength is essential to raise it out of the hole. Truly—here are daily tasks to test wire rope performance to the utmost. To keep equipment on the job—to eliminate costly replacements and assure lower operating costs—most users specify American Steel & Wire Company American Wire Rope. Experience has proved its superiority—the service back of it is a valuable asset.

1831 MORE THAN 100 YEARS OF PROGRESS IN WIRE MAKING 1932

AMERICAN STEEL & WIRE COMPANY
SUBSIDIARY OF UNITED STATES STEEL CORPORATION
208 South La Salle Street, Chicago And All Principal Cities
Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco
Export Distributors: United States Steel Products Company, New York

Shots From the Firing Line — *Continued*

Indiana Notes

JOHN L. NEWMAN

John L. Newman, age 71, died at his home in Evansville, March 17th. Mr. Newman was the contractor for virtually all the sewers built in Evansville during the past 30 years with the exception of Kentucky Avenue and Howard Roosa projects. He retired from active contracting two years ago, with his son, John L. Newman, Jr., becoming head of the sewer-building firm bearing the Newman name. Surviving are three sons, a daughter, three brothers and one grandchild. Funeral services were held March 21st.

Here is a picture of one of the Loomis electric drills putting down holes in the overburden at **Electric Coal Company** mine near Oakland City, Indiana.

Central Construction Company, of Orleans, was awarded 8½ miles of grading on Route 50 in Martin and Lawrence Counties for $119,660.

The State Tax Board has approved a bond issue of $400,000 by South Bend for the city's share of the cost of elevating New York Central and Grand Trunk railroad tracks at certain streets.

Illinois Notes

A representative of the **Burns & McDonnell** engineering firm, of Kansas City, in a speech before the Rotary Club of Springfield, reported that 5,200 acres of the 7,800 needed have been acquired for Lake Springfield. There will be 4,270 acres flooded of which 1,700 have been cleared. Construction of the dam is planned to be undertaken in 1933. Three of the five bridges needed are to be built this year.

County Superintendent of Highways Elmer Mitchell, of Pekin, has prepared a tabulation showing that $160,000 will be available for highway construction in Tazewell County during 1932. This has been apportioned to the following routes: State Aid Route 10D, South Pekin, $25,000; State Aid Route 7, Cincinnati and Spring Lake townships, $50,000; State Aid Route 7, Tazewell-McLean county line, $30,000; State Aid Route 6, Mackinaw to Deer Creek, $62,000 (contract already let).

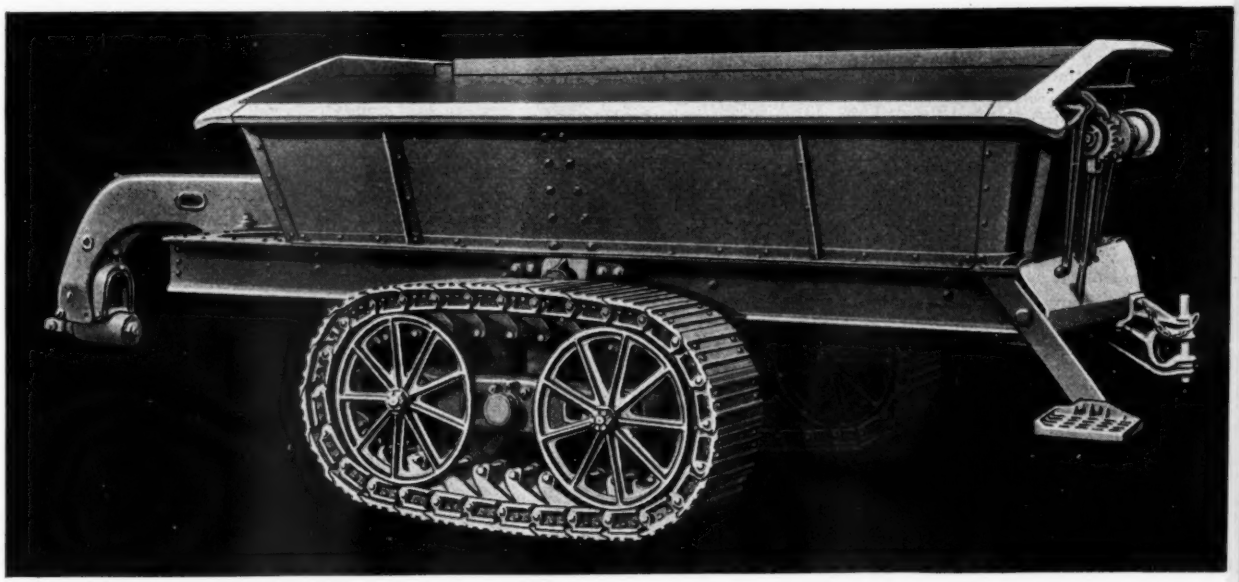
The Arundel Corporation, of Baltimore, was the low bidder for the dredging in Des Plaines River between Brandon Road and Dresden Heights when the bids were opened by War Department Engineers March 26th. The low bid was $536,000. Completion in 240 days is specified.

The M. W. O'Meara Company, of Quincy, Illinois, submitted low bid of $11,417.97 for the work of straightening and deepening the Mill Creek Channel from short distance west of Milan to the Mississippi River. There were 38 other bids ranging up to $70,970. Bids were opened March 15th and award awaits the approval of Col. George R. Spalding at St. Louis.

A veterinary makes the best Doctor. He can't ask the horse, "What seems to be the matter?" He has to go ahead and find out.

MEETING PLACE OF CAPITAL AND LABOR
THE KOENIG LABOR AGENCIES
Established 1875
ST. LOUIS
612 Walnut Street
Main 2766 and 2767
KANSAS CITY
501 Delaware Street
Main 0796
HELP OF ALL KINDS FURNISHED FREE

Announcing the Forged-Trak Bottom Dump Trailer



These NEW Features

- Built Up Track—Drop Forged Interlocking Links
- Lowest Loading Height—Extra Length And Width of Top
- Cast Steel Arched Drawbar, Permitting 115° Turning Angle
- Tractor Hitch—Double Acting, Spring Mounted, Reversible
- Heavy, High-Carbon Steel Plate Body With Bulb Angle Sills
- Modified Taper Ends With Rounded Corners—Hand-Operated Cable "Wind-Up"—For Fast, Clean, Easy Dumping

Every Proved Mechanical Feature

at these low prices

5-Yard	$1695.00
6-Yard	1745.00
7-Yard	1945.00
8-Yard	1995.00

F. O. B. Chicago

ATHEY TRUSS WHEEL CO.
Dept. A-1, 130 North Wells Street, Chicago, U. S. A.
Cable Address "Trusswheel" Chicago

Forged-Trak

REG. TRADE MARK

Shots From the Firing Line — *Continued*

St. Louis and Vicinity

By A. J. KOENIG

Frazier-Davis Construction Company was low bidder for the construction of two sewers in St. Louis. A bid of $30,622 was made on the Manchester sewer and $32,434 for the Rosedale Ave. sewer.

Morris A. Wogan, Kansas City was awarded contract by the U. S. Engineers for 1460 feet standard pile clump dike in the Missouri River at Dozier Bend on a bid of $29,862.

William A. Riley Construction Company was low bidder for the construction of the Taylor Ave. sewer. The Whittier Street sewer and the Newstead sewer were awarded to **Martin & Reilly** of St. Louis.

Bids will be called for in a short time for the constructing an underpass on Welling Ave. in St. Louis, with double track bridge. F. C. Jonah, chief engineer Frisco Lines, St. Louis.

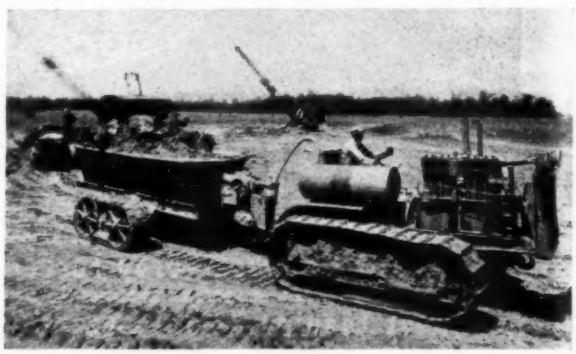
Cook & Waddell, Ottawa, Kansas were awarded contracts for the construction of three bridges in Sumner county, Kansas.

Louis Rich Construction Company, East St. Louis, was awarded contracts for three section of concrete pavement in Bond county and three section of grading on route 185 in Fayette county Illinois.

On their bid of $152,587 the **McCarthy Improvement Company** of Davenport was awarded contract for paving on route 107 in Pike county Illinois.

Bids were received by the Missouri State Highway department on April 7th for constructing 107 miles of 20 and 10 foot concrete pavement, 91 miles of gravel road, five miles of grading and three bridges. Approximately $1,670,000. The low bidders follow: 14.059 miles paving in Andrew and DeKalb county, **Pope Construction Company**, Jefferson City, $144,588; 6.158 miles in Cass county, **Sandy Hites**, Kansas City, $75,577; 6.652 miles paving, Carroll county, **Perry McGlone**, Harrisonville; 27.374 miles concrete paving, 8 sections in Moniteau, Morgan and Cooper counties, **Hoeffken Bros.**, Belleville, Illinois; 12.415 miles paving, Lewis county, **Hartman-Clark Bros.**, Peoria, $200,307; 7.327 miles paving, Moniteau county, $83,460; Bridge, St. Clair county, $42,445, **Kelly & Underwood**, Granby, Missouri; 11.793 miles 10 feet paving in Randolph county, $55,920, **C. H. Atkinson Paving Company**, Chillecothe, Missouri; .605 miles paving, Webster county, $19,284, **Garrett Construction Company**, Springfield; 14.417 miles 10 feet paving, Ray county, $92,613, **Independent Construction Company**, Pittsburg, Kansas; 6.989 miles paving, Stoddard county, $103,387, **Markham Construction Company**, Cape Girardeau, Missouri; bridge, Cedar county, $37,736, **Glen E. Stoner**, Springfield; bridge, Howell county, $5,492, **J. A. Kerr**, Ozark, Missouri.

Gravel: 0.22 miles Adair county, $18,576, **Amos Melberg**, Cedar Rapids, Iowa; 1.511 miles Audrain county, $3,291, **Samples & Elsea**, Kirksville, Missouri; 3.859 miles, Cape Girardeau county, $10,771 **Richmond Construction Company**, Advance Missouri; 11.648 miles, Cedar county, $74,496, 2.738 miles Ralls county, $21,574; 13.756 miles St. Clair county, $123,067, to **Martin Wunderlich**, Jefferson City; 5.236 miles Grundy county, $18,133, **C. W. Rose**, Brookfield; 3.174 miles, Miller county, $14,371, **Neyer Construction Company**, Billings, Missouri; 0.545 miles Monroe county, $25,672, **F. W. Whitehead**, Kahoka, Missouri; 6.907 miles Ozark county, $59,490, **Service Construction Company**, Poplar Bluff, Missouri; 6.799 miles, Pemiscott county, $12,689, **Richmond Construction Company**, Advance, Missouri.



On Birds Point-New Madrid Spillway Levee (Piece No. 4-C) a few miles south of East Prairie, **J. C. Johnston Construction Company** of East Prairie teamed up Caterpillar tractors with LaPlant-Choate wagons on this 2,153,000-cubic-yard levee building job with very pleasing results. The material was loaded by Koehring and Northwest draglines and eight wagons were used. A total of 1,609,213 cubic yards or 201,151 cubic yards per wagon was moved with a repair part cost of $346 per wagon or $0016. per yard.

Massman Construction Company, Kansas City, was low bidder for the construction of 3600 feet standard pile dike in the Mississippi River about 50 miles above Cairo.

River Notes

Contract for 146,000 cubic yards of new levee work on the west bank of the Red River in Arkansas in three items south of Garland, was awarded to **Wills Construction Company**, St. Louis, Missouri.

Bids were taken on April 20th at the U. S. Engineers Office, St. Louis, for placing of 1,050,000 cubic yards of earthwork in rebuilding and enlarging the levee of Scott County drainage and levee district, Scott County, Illinois, on the Illinois River. The work starts about 2 miles south of Naples and the lower flank adjoins the upper flank of the Big Swan Drainage & Levee District. There are two sections, one of 18,000 feet covering levee of average 14½ feet in height and one 36,100 feet covering levee average 15½ feet in height. Completion is required in 200 calendar working days.

WHY
risk loss
from
FIRE!
Here's a fire-fighter which acts quickly . . and just think! . . . it can be used without danger on electrical equipment of high voltage.
Will not cause damage to machinery nor materials . . . has practically no wetting effect.
It's just the protection *you need!* Keep a *Fire-Gun* handy.
Write now for prices.
BUCYRUS-ERIE COMPANY
Specialty Dept.
So. Milwaukee, Wis.
BUCYRUS ERIE

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue

Narrow Gauge Dump Cars For Your Big Shovel

A train o 12-yard Western Drop Door Dump Cars at the Baltimore Colliery, Wilkes-Barre, Pa., where A. E. Dick Contracting Co. are engaged in removing several million cubic yards of overburden. The shovel, an electric 120-B Bucyrus-Erie, has a 4-yard dipper.

NO LONGER need narrow gauge car equipment determine the size of your shovel. The narrow gauge, 12-yard Western is large and strong enough for use with big shovels. This drop door car is the largest and strongest narrow gauge car made.

It has every feature that has made the big Westerns outstanding successes. Its reliability has been demonstrated through three years of the hardest service.

The car gives unrestricted loading and dumping; a steep dumping angle; low loading height; exceptional track-riding ability. There are no side chains or locks.

Unless conditions demand standard gauge equipment, reduce your track and dump costs by installing narrow gauge Westerns.

Western Wheeled Scraper Company, Aurora, Ill., U. S. A.

WESTERN

For your convenience in writing to Western Wheeled Scraper Co., you will find a card bound in this issue.

Shots From the Firing Line — *Continued*

Southern Notes

By W. W. WHORLEY

Christie, Hutchinson & Burton, Birmingham, have taken over the Fairfax Construction Company contract on Valley Creek in the city of Birmingham. The work of the latter

company on two sections of this contract was illustrated and described in Excavating Engineer for March, 1932.

The illustration above shows Christie, Hutchinson & Burton's Bucyrus-Erie 42-B steamer loading rock from the channel. As many as 286 four-yard cars have been loaded with rock by this machine in a shift of 11½ hours. Vader Roberts has been handling the levers with L. N. Daniel on the firing end. John Roberts is operating on the opposite shift. The rock is shot before the shovel can load it out, air being furnished to jackhammers from a nearby steam plant and Ingersoll-Rand compressor.

The illustration also shows Earl Burton, Vice-President (on the left), and Samuel J. Hutchinson, Secretary-Treasurer, watching the progress on the job.

Texas Notes

Dallas will ask for bids in the near future for the construction of a subway to carry the combined Lamar and McKinney streets under 12 tracks of the Chicago, Rock Island and Pacific, Missouri-Kansas-Texas, and St. Louis Southwestern. The total cost of the project is estimated at $255,000.

Arizona Notes

Lewis Brothers of Winslow, Arizona with a bid of $6,644.00 was low bidder for grading, draining and subgrade stabilizer from St. Johns towards Holbrook for 5½ miles. This project includes 56,251 cubic yards of excavation.

Wyoming Notes

The Wyoming State Highway Department, Cheyenne, is co-operating in the production of an 8-color map showing the Wyoming state highway system, roads, streams, airways, and historical trails.

"Well," said the customs inspector at the Canadian border to the dusky driver of the ancient Ford. "Have you any dutiable stuff?"

"No, sah," said the dusky driver. "I got me a couple bottles o' gin, but that ain't no duty. 'At's a pleasure."

San Francisco and Vicinity

By H. L. LIVINGSTON

E. C. Coats of Sacramento submitted low bid to the California Division of Highways for 8.7 miles of grading and surfacing in Shasta County, California, from Hat Creek Summit to Fall River Mills. This job involves 442,800 cubic yards of roadway excavation.

While it is thought that the sun always shines in Sunny California, we show a Gas+Air shovel at Bodie, which was used to clean up streets and rescue automobiles this last winter during the extremely heavy snows. This shovel is used at the Treadwell Yukon Company's mine at Bodie and works at an altitude of 10,000 feet. George Utley is the operator on this machine.

The Lee Moor Contracting Company of El Paso, Texas, will soon be moving their equipment into California to start work on a large highway job in Riverside County from Blythe to Ehrenberg Bridge. This job has 198,000 cubic yards of borrow and a considerable amount of surfacing.

The Bodenhamer Construction Co. of Oakland was low bidder to the California Division of Highways for 7.5 miles of grading and concrete paving in San Diego County. In addition to the paving, 150,000 cubic yards of excavation is included in the contract.

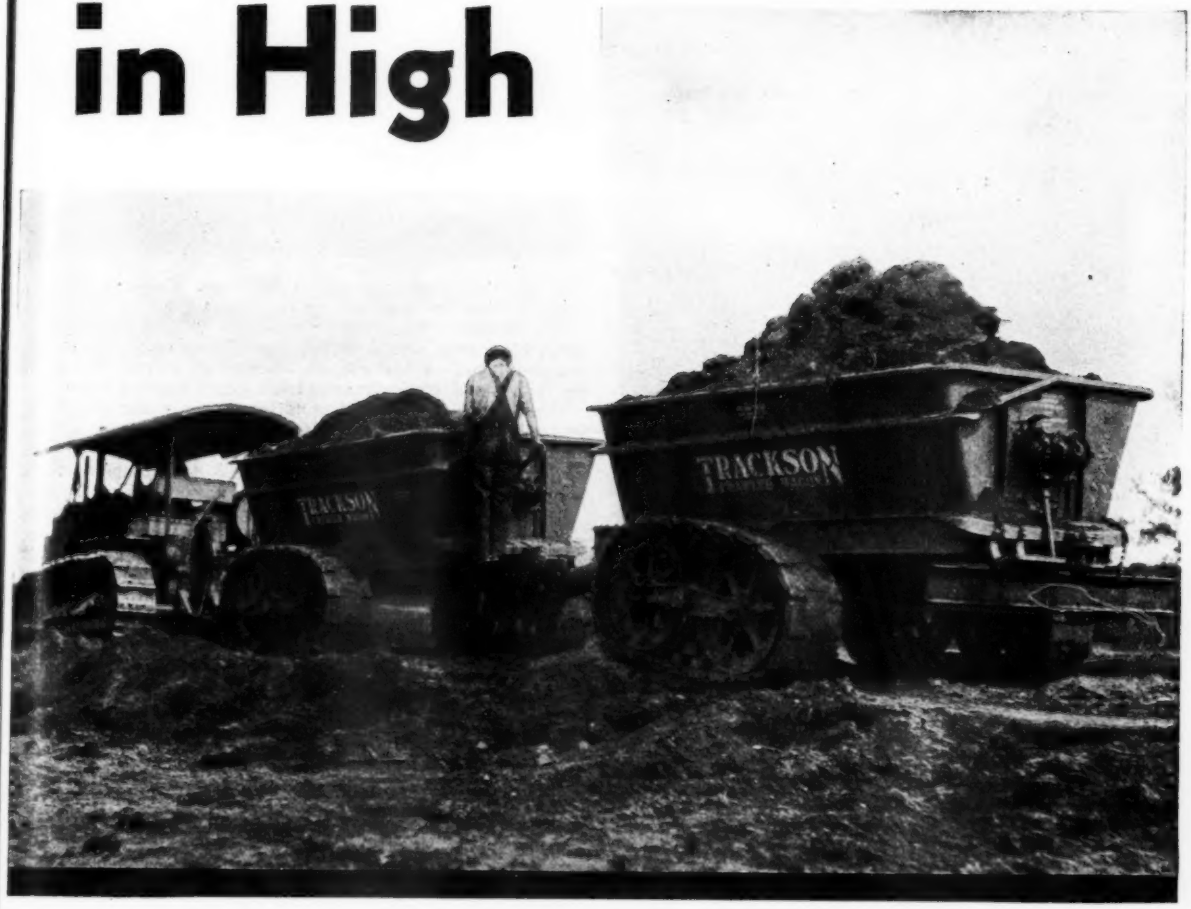
Merritt Chapman & Scott of San Pedro, who bid $351,000.00, were low bidders to the City of Stockton for their harbor development project. This bid includes the building of wharves, sheds and a water system. The City of Stockton has a tentative program under way to enlarge their harbor and bring in deep-water shipping that has in the past been obliged to dock at San Francisco.

Plans and specifications are being prepared by the California Highway Commission for about six miles of grading in Santa Cruz County from Inspiration Point to Scotts Valley. Bids on this work will be called for sometime in May. This should be an ideal shovel job as 800,000 cubic yards of excavation will be moved on the six-mile job.

INFORMATION — pertaining to the profitable use of Hayward Buckets by many concerns may be obtained by addressing The Hayward Company, 52-54 Church St., New York, N. Y.
Hayward Buckets

For your convenience in writing to The Hayward Company, you will find a card bound in this issue.

16 Cu. Yards in High



NOT a trick stunt, but a normal operation: Two Trackson Crawler Wagons, hitched together and loaded to full 16-yard capacity, making the round trip from shovel to dump with the "Cat 60" running in high gear all the way. To do that consistently day after day you've got to have crawler wagons that run easy—crawler wheels that are simple in design, without the drag and wear of complicated parts; wheels that can be kept easy-running by quick and easy adjustment; wheels that will *stay* easy-running because their vital parts can readily be renewed in the field. Plan now to put Trackson Wagons on your next job so that you can haul full loads at top speed and lowest cost. Plan now, at least to replace your present worn wheels with Trackson Wheels and be through wasting power on needless weight and drag. Trackson Crawler Wheels *stay* easy-running.
TRACKSON COMPANY, 1330 S. First St., Milwaukee, Wis.

TRACKSON
CRAWLER WAGONS

For your convenience in writing to Trackson Company, you will find a card bound in this issue.

Shots From the Firing Line — *Continued*

Bids will be issued about May 1 by the U. S. Bureau of Public Roads for grading and draining 7.08 miles of highway in San Gabriel Canyon. The estimated cost of this project is $1,000,000.00 and involves in the main 1,540,000 yards of highway excavation; one bridge 260 feet long and several half bridges.

A contract has been awarded to the **Thompson Construction Company** by the City of Fresno for the construction of a subway to carry Belmont avenue under the tracks of the Southern Pacific. The estimated cost of the project is $240,000.

Los Angeles and Vicinity

By FLOYD McCRACKEN

The above picture shows a Bucyrus-Erie 37-B Diesel machine owned by the **Department of Water & Power**, City of Los Angeles operating near the Colorado River on water exploration work.

An interesting experiment with Link-Belt conveyors for moving loose earth and clay 2,000 feet for use in a dam was tried by **R. G. LeTourneau, Inc.**, Stockton, contractor who has just completed an earth-fill dam containing 1,-103,000 yards of material in Santiago canyon, six miles east of Orange.

The conveyor proved to be a speedy method for transporting the material when it could be operated, requiring two shovels to keep it supplied. However, after the conveyor had operated very successfully for about thirty days, the exploration for foundation at the east end of the dam disclosed large clay deposits which were used instead of the clay pits two thousand feet away. It thereby shortened the hauling distance to such a point so that it was about a stand-off between the conveyor and the LeTourneau twelve-yard carts hauling direct from the shovel. The conveyor was, therefore, discontinued for the balance of the operation. R. G. LeTourneau, President and Manager, states, however, that the conveyor operation has great possibilities.

Ten shovels, six Caterpillar 60's with 12-yard LeTourneau carts, 35 trucks, and a varied line of accessory equipment was employed on the project. Begun in March last year, the dam stood virtually completed eight months later.

The dam rests upon a foundation of shale and sandstone 30 feet below stream bed. It impounds to a depth of 110 feet and has a storage capacity of 26,000 acre feet which its owners hope will drain from the 63 square miles in the Santiago drainage basin.

The 12-acre up-stream surface of the dam is faced with six-inch reinforced concrete to protect the clay from rain, wind and wave action. A spillway adequate to carry 24,000 second feet, considered the maximum storm to be expected in 1,000 years, is provided.

Water impounded in the reservoir is to be divided equally among owners of the project, the Irvine Ranch Company, the Serrano Water Company and the John T. Carpenter Water Company.

The dam was designed by A. Kempkey of San Francisco. Surveys and foundation tests were made under direction of C. Roy Browning, engineer for the Irvine Company.

Oregon Notes

Gilbert & Goodwin, of Portland, were awarded grading and surfacing on the Vesper Section of the Secondary State Highway No. 102 in Clatsop County. The work consists of 2.5 miles of grading and 4.1 miles of surfacing with concrete pipe culverts.

Carl Nyberg of Spokane on the basis of alternate number one with a bid of $99,527.00, was awarded the contract of grading and surfacing 6.3 miles on the Durkee-Gales section of the Old Oregon Trail.

Washington Notes

The Campbell Construction Company, of Renton, with a bid of $78,507.35, was awarded the contract for clearing, grading, surfacing with crushed stone and draining about 2.7 miles of State Road No. 1, Deming, to Welcome Grange Hall (Mt. Baker Branch) in Whatcom County involving about 17.5 acres of clearing, 157,730 cubic yards of excavation, 7,220 cubic yards of crushed stone, 10,160 lineal feet of cable guard rail, 2,186 lineal feet of pipe culverts and other items.

S. A. Moceri, Inc., of Seattle with a bid of $237,800.15 was awarded the contract for street reconstruction work in Seattle. The contract consists of regrading, installation of sewers, side sewers, watermains, hydrants and concrete stairways. The work comes under Ordinances No. 61828 and 62194, Local Improvement District No. 5325.

The General Construction Company of Seattle with a bid of $123,286.42 was low bidder for grubbing, grading and draining about 6.2 miles of State Road Number 12, Cosmopolis to Arctic, Federal Aid Project No. 187A; in Grays Harbor County, involving about 35.5 acres of grubbing, 447,580 cubic yards of excavation, 6,070 lineal feet of pipe culverts and other items.

You don't know how economical
YELLOW STRAND
WIRE ROPE can really be until you try "Flex-Set" Preformed Yellow Strand on your excavating machinery. Made of tested, *selected* wire.
Get Catalog 51
BRODERICK & BASCOM ROPE CO.
ST. LOUIS
Seattle, Wash. San Francisco, Cal. Los Angeles, Cal.
Portland, Ore. Houston, Tex. New York, N. Y.
Factories: St. Louis and Seattle
P-48

For your convenience in writing to Broderick & Bascom Rope Co., you will find a card bound in this issue.

PRICES REDUCED $1380 TO $1625

Hauls its own pay load—
uses but one set of tracks

New Prices—the Lowest in LINN History

Effective immediately, prices for the LINN are reduced substantially—the reduction on model 4-28-D amounting to $1380.; and on model 6-28-D, $1625.

LINNS can now be bought for:

Model 4-28-D LINN Tractor complete with 75 H. P. motor, wheel or sled steerage, closed cab, electric lights and starter, high speed reverse and rear tipping LINN dump body and hoist with spreader or down fold tail gate **$6,080.00**

Model 6-28-D LINN Tractor complete with 100 H. P. motor, wheel or sled steerage, closed cab, electric lights and starter, high speed reverse and rear tipping LINN dump body and hoist with spreader or down fold tail gate **$6,380.00**

These are the same identical LINNS which up to now sold for $7460. and $8005. respectively—the same dependable, all-weather LINNS which have always moved yardage at lower cost than other types of equipment. Now, at these lower prices, the contrast in comparative yardage costs is more pronounced than ever.

In fact, LINNS are now so priced as to be definitely in the class of *all-service* equipment—and should be a permanent part of every contractor's plant.

LINN TRACTORS

Patent No. 1,270,531
Patent No. 1,521,454
Patent No. 1,685,641
Patent No. 1,685,676
Patent No. 1,701,979
Other Patents Pending

Represented in:

New York, N. Y. — Pittsburgh, Pa.
Skowhegan, Maine — Louisville, Ky.
New Haven, Conn. — Chicago, Ill.
Johnson City, Tenn. — St. Louis, Mo.
Omaha, Nebr. — Denver, Col.
Little Rock, Ark. — St. Paul, Minn.
Los Angeles, Calif. — Portland, Ore.
Salt Lake City, Ut. — Spokane, Wash.
Allentown, Pa.

Canadian Linn Distributors:
Mussens Limited, Montreal

LINN MANUFACTURING CORPORATION

Division of LA-FRANCE-REPUBLIC Corporation

FACTORY: MORRIS, NEW YORK

For your convenience in writing to Linn Manufacturing Corporation, you will find a card bound in this issue.

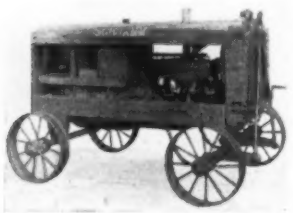
Equipment You Ought to Know About

(Continued from Page 246)

New Portable Welder

A COMPLETE line of portable engine-driven welders, designed to meet the exacting requirements of welding in the construction industry, has been announced by *Schramm, Inc., West Chester, Pa.*

The line includes four sizes, 200, 300, 400 and 600 amperes units containing the latest improvements in welders of this type. The generator unit is designed for rapid voltage recovery, assuring the operator of a stable and "peppy" arc. A transforming reacter automatically steadies and regulates the arc.



Single-operator welding machines are available, consisting of a variable voltage type of welding generator, direct-connected to a gasoline engine. Also duplex units having two welding generators.

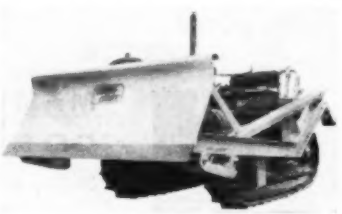
Any of the mountings for portable use can be supplied, such as spring trailer, Highway Trailer, two wheel pneumatic-tired, rubber-tired wheels, steel wheels, skidded and for mounting on all standard makes of motor trucks. Additional information will gladly be supplied by Schramm, Inc.

Loomis "Clipper" on Full Length Crawlers

A BLAST HOLE drill on full length crawlers has recently been added to the "Clipper" line by *Loomis Machine Co., Tiffin, Ohio.* The machine is built on a low frame with the crawlers driven by heat treated chains and operated by friction clutches. The manufacturers have to say of this machine, "It will crawl an unbelievable steep grade and can be turned almost within its own length and quickly set in position. In many operations time saved in moving can be profitably employed in drilling hole thus increasing the amount of drill hole and cheapening the cost per foot." Further information may be had by writing Loomis Machine Company. Please mention *Excavating Engineer.*

Hydraulic Hylift Bulldozer

A RECENT development of the *LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa,* is the new Hydraulic Hylift Bulldozer. The outstanding features of this bulldozer are, according to the manufacturer: Extra high lift which enables the blade to be raised 33 inches above the ground level; new Type H Main frame design and high lift mechanism at the rear of the tractor, which allows the blade to drop 18 inches below the track ground line; double acting jack which forces the blade into the ground or raises it quickly in the hardest going; unit with the blade and jack built compactly to the tractor to facilitate its use in close quarters; design which leaves the tractor drawbar entirely in the clear, so that it may be used for hauling wagons or other equipment without removing the bulldozer and complete ground clearance when the blade is raised prevents the unit from "High-centering" on the Bulldozer main frame.



Additional information may be had by writing LaPlant-Choate Mfg. Co.

New Wheel Dumptor

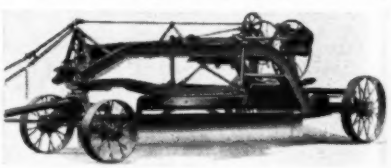
DESIGNED for use on dirt-hauling jobs where tractive ground conditions permit the use of wheels, the Koehring Wheel Dumptor provides low cost, dependable high speed transportation. It is built by the *Koehring Division* of the *National Equipment Corporation, Milwaukee, Wisconsin,* and has a load-carrying capacity of 4 cubic yards.

Here are some of the features of the Wheel Dumptor according to the manufacturer: three speeds forward and three speeds reverse, can shuttle on must hauls; with the high reverse speeds, it also eliminates turns and saves many seconds each trip; constant mesh transmission; instantaneous gravity dump and kickout pan; exceptionally short turning radius; and wheel equipment is interchangeable with lug type tractor tires to 24" steel wheels.

Other construction details are: pressure lubricated clutch throwout bearings; full pressure lubrication of all motor parts; packless water pump; only one grease cup on entire power unit; two air cleaners in series; and 4" final drive axles of chrome vanadium steel. Complete information on this new unit will be gladly furnished by the manufacturer.

New Caterpillar Leaning Wheel Grader

A MASSIVE grader of the leaning wheel type—team-mate for the Fifty tractor—is the new "Caterpillar" Fifty Grader. It has a 12-foot blade that turns power at the drawbar into great yardages of earth moved per day; flexibility that allows bank cutting 9 feet high at an angle of 20 degrees off perpendicular; blade range that gives a side reach of 62 inches outside of rear wheels for shoulder work (when standard blade is set at a 45 degree horizontal angle); and great reach by applying blade extensions.



Among the additional features mentioned by the manufacturers are: entire lifting mechanism mounted on anti-friction bearings; lift arms, shafts and important forged parts are heat-treated; bronze lift gears adjustable to six points of wear; extensible lift links with ball and socket connections and shins for take-up; compensating blade lift springs; axle spindle chrome nickel heat treated steel; tapered roller bearings, cork seals and metal guards in all wheels.

Complete specifications may be had by writing *Caterpillar Tractor Company, Peoria, Illinois.*

STEEL

For moving timbers, track, stone and steel; handling pipe; excavating from caissons, shafts or trenches; the Loadmaster offers the attractive combination of speed and economy.

GIRDERS

This handy crane renders valuable assistance in erecting steel, loading and unloading material and supplies, installing and overhauling equipment.

TO

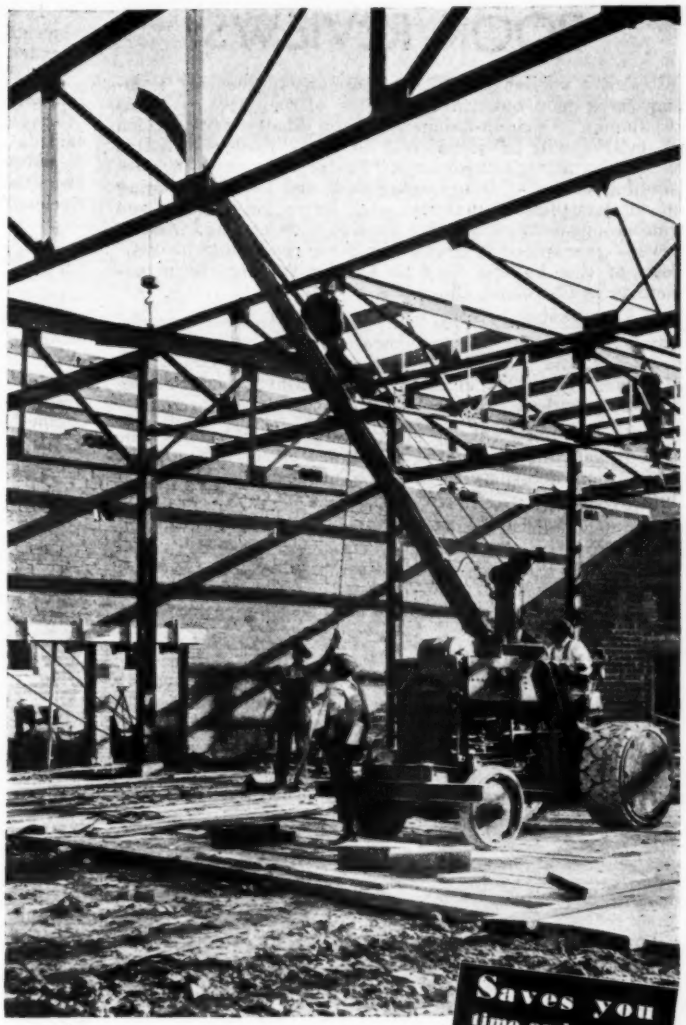
Those rush orders get special handling without unnecessary increase in cost when a Loadmaster is on your job.

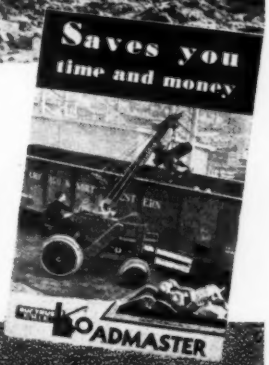
COTTON

Bulk as well as weight may complicate your handling problem. But, whatever your problem, consider reducing costs with Loadmaster. Its field of usefulness is not limited by the length of its boom. It carries its load from pile to pile or from one end of the job to the other, as you wish.

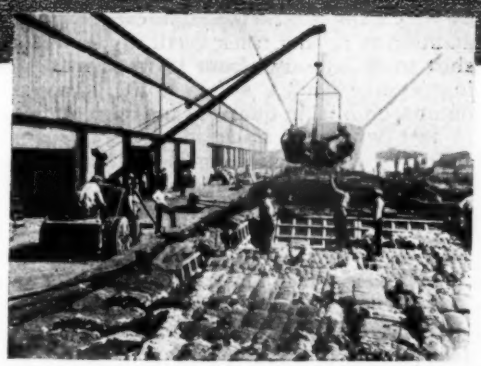
BALES

Bales, boxes or crates are readily handled by the Loadmaster. For bulk materials convenient containers are available. Trailers, readily coupled behind, are quickly loaded, hauled, unloaded.





● **Get this new book of Loadmaster pictures, illustrating many uses owners have for it. You may find in it a solution of your material handling problems. Send the coupon for your copy today.**



BUCYRUS-ERIE COMPANY, South Milwaukee, Wis.

Gentlemen:

Send along my copy of the new book on Loadmaster which illustrates material handling methods.

Name_____

Firm_____

Address_____

City_____

Business_____

When writing to Bucyrus-Erie Company, please use coupon or card bound in this issue.

BOOK REVIEWS

Recently published by **The Wellman Engineering Company** is a new bulletin descriptive of the new Williams "Champion" Cleanup-Rehandler Clam Shell Bucket which we believe will be of interest to many readers. Of this bucket the manufacturer says, "Faster than any other rehandling bucket—for unloading cars and barges, cleaning up shallow piles of material, etc. Extra long hinges and wide scoops—covers a wider area at each closing. Greater power—guaranteed to outdig any other rehandling bucket." Copy of this bulletin may be had by writing the manufacturer at Cleveland, Ohio.

An explanation of "Flex-Set" pre-formed construction of wire rope is contained in a small circular distributed by **Broderick and Bascom Rope Co.**, 4203 N. Union Blvd., St. Louis, Mo. This circular will be sent to any reader upon request.

A new 24-page catalog illustrating and describing the LeTourneau line of heavy grading equipment is ready for distribution, according to **R. G. LeTourneau, Inc.**, of Stockton, California.

Two new bulletins which recently have been issued by the **S. G. Taylor Chain Company**, Hammond, Indiana, cover Taylor Made Weldless Wire Chains, and Taylor-Made Wear Resisting Drag Line Chain. They will be sent by the manufacturer upon request. When writing, please mention Excavating Engineer.

Caterpillar Tractor Company, Peoria, Illinois, has recently published an 18-page catalog on the Caterpillar Elevating Grader. Operating views as well as parts illustrations are in abundance—with ample copy to make the bulletin of real value to any reader interested in this type of equipment.

The new **Directory of Contractors**, issued by the Bureau of Contract Information, Inc., 437 Munsey Bldg., Washington, D. C., has just been completed and is available to those responsible in the award of public and private construction contracts.

"How Shall We Handle It?" is the title of a recent publication of the Diamond Rubber Company. The booklet of 24 pages (11x8½) contains many illustrations showing various applications of Diamond conveyor belts in some 27 different industries. For a copy of this booklet, write **The Diamond Rubber Co., Inc., Akron, Ohio,** mentioning Excavating Engineer.

A handy and informative book, entitled "Safety in the Handling and Use of Explosives," has recently been published by the **Institute of Makers of Explosives**, New York City. As explained in the preface, the methods recommended are based on years of study and the combined experience of many men engaged in the use of explosives in practically every type of work. The fundamentals of approved safety practices, described by the text and illustrated with photographs and drawings, are intended to give a practical and comprehensive knowledge of the precautions to be observed.

A Caterpillar road machinery condensed catalog was recently published by **Caterpillar Tractor Co.**, Peoria, Ill., giving a brief description of each of the machines that form the complete Caterpillar line. The 32-page catalog, 9x6, is well illustrated with both operating and display photographs.

Hazard Wire Rope Company, Wilkes-Barre, Pa., has recently published a 16-page booklet entitled "12 Reasons Why You Save Money with Lay-Set Pre-formed Wire Rope." When writing Hazard Wire Rope Company regarding this booklet, please mention Excavating Engineer.

Caterpillar Tractor Co., Peoria, Illinois, recently published a 32-page bulletin on the Caterpillar (Power Operated) Auto Patrol. The bulletin, like all Caterpillar publications, is excellently illustrated and will be of value to any reader wishing to secure information on this type of equipment. When writing for a copy, please use postcard found in the center of this issue.

Easy Lifting—Handles up to 12,000 pounds

Handy Hoists are ready for work in a jiffy, no heavy blocks or surplus chain to handle.

Will work in tight places. A one man tool.

Write for prices

BUCYRUS-ERIE COMPANY

Specialty Department
South Milwaukee, Wis.

BUCYRUS ERIE

No Jacks Are Used on this Track Raising Job

Raising track is only one of the uses to which the Track Machine can be put. In addition to raising track vertically, it will also shift track laterally, from 18 to 36 inches being attained at a single shift. On waste dumps, on fills, in quarries and open pit mines, in fact wherever track must be raised and shifted and a track gang is maintained, this machine is a time and money saver. Why continue with old-time hand methods for which machinery is now available?

NORDBERG MFG. CO., Milwaukee, Wis.

THE NORDBERG PATENTED TRACK SHIFTER

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

Manzel Brothers Company, 309 Babcock Street, Buffalo, has issued catalog No. 31 describing the new model Force Feed Lubricator which has recently been placed on the market. A copy of this 20-page, 6x9 catalog will be sent to any reader interested in this new lubricator. Please mention Excavating Engineer when writing.

Naylor Pipe Company, 1230 E. 92nd Street, Chicago, Ill., has recently issued Technical Data Bulletin No. 32-3 on Spiralweld Cement-Lined Gunite Coated Pipe. This 20-page bulletin, 8½x11, is well illustrated and contains tables and graphs of various tests given this product.

The Wellman Engineering Company, Cleveland, Ohio, has just published a new four-page illustrated bulletin on the Williams "Double-Arch" dragline bucket. This bulletin will be sent to any reader who wishes it. When writing, please mention the Excavating Engineer.

TRADE NOTES

The Linn Manufacturing Corporation, Morris, N. Y., manufacturers of the "flexible traction unit" Linn truck tractor have just announced price reductions ranging from $1380 to $1625, according to models.

The 100-h. p. 6-cylinder Linn, which previously sold for $8005, is now $6380. The 75-h. p. 4-cylinder, formerly $7460, is now $6080. Standard equipment includes wheel or sled steerage, closed cab, electric lights and starter, high-speed reverse and rear tipping Linn dump body and hoist with spreader or down fold tail gate.

Blaw-Knox Company, Blawnox, Pa., and the **Western Pipe & Steel Company,** of San Francisco and Los Angeles, have closed an agreement, according to recent announcement, whereby the latter will manufacture Blaw-Knox products on the Pacific Coast and will sell through the organization of a new company to be known as Blaw-Knox & Western Pipe Corporation. This new concern will be equally owned by the two companies.

The S. G. Taylor Chain Company has ready for distribution a new price list covering both their Mesaba and Dredge Iron grades of Sling Chains. A copy may be had by writing the S. G. Taylor Chain Company at P. O. Box 1297, Hammond, Indiana.

The Nordberg Manufacturing Company, Milwaukee, Wisconsin, recently announced the appointment of A. E. Ballin as Vice President in Charge of Sales and Engineering. Mr. Ballin was formerly President of McIntosh & Seymour Corporation.

La Consolidada, S. A., of Mexico, D. F., one of the largest steel manufacturers in Mexico and the foremost advocate of arc welding in that republic, have been appointed Mexican distributors by **The Lincoln Electric Company** of Cleveland, Ohio, manufacturers of "Stable Arc" welders and supplies, as well as "Linc-Weld" motors.

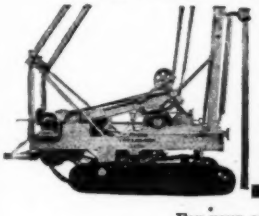
The Blaw-Knox Company, Blawnox, Pa., has added a new department to its organization, which has been organized for the production of Dust Collection Equipment.

INCREASING FOOTAGE

by steadier drilling is the surest way to greater profits.

The speed of Loomis Full Length Crawler Mounted "Clipper" drills, in moving and getting set over the hole, gives more time for drilling and insures increased footage.

Size 44 "Clipper" comes equipped with steel frame; steel or wooden mast, wire or manila line.



WRITE FOR FULL INFORMATION
Established 1842

THE LOOMIS MACHINE CO.,
K STREET TIFFIN, OHIO

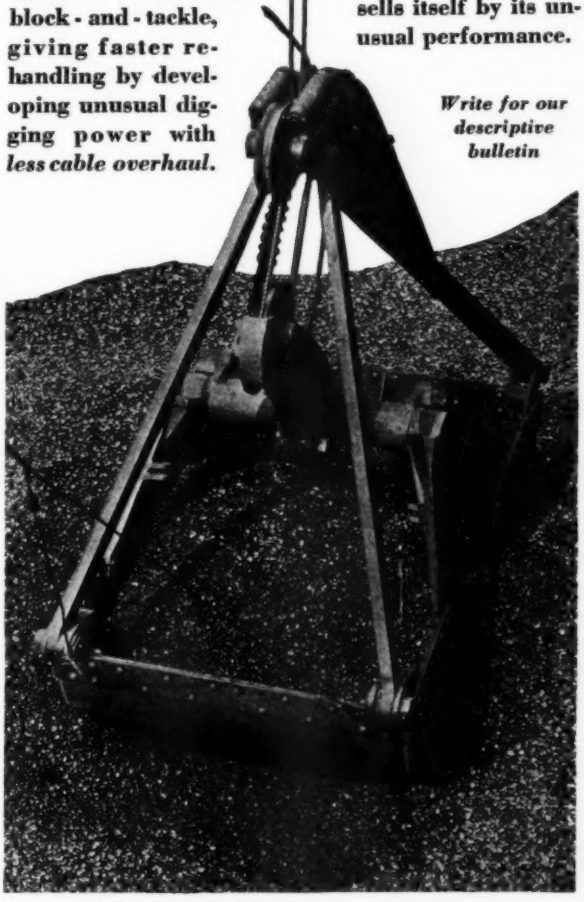
WILLIAMS
CLEANUP-REHANDLER

For Faster Digging... and Lower Upkeep!

It has the Williams Power Arm combination of lever and block-and-tackle, giving faster rehandling by developing unusual digging power with *less cable overhaul.*

Try this new "Champion" Cleanup-Rehandler on your own work whether it's unloading cars, barges, handling crushed stone, sand, gravel and similar loose material—make any test you want. It sells itself by its unusual performance.

Write for our descriptive bulletin



We build buckets from the very smallest to the very largest and for every purpose.

THE WELLMAN ENGINEERING CO.
7002 Central Ave., Cleveland, Ohio
Birmingham — New York — Chicago — Pittsburgh — Detroit — Mexico

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

The Business Situation

(Continued from page 244)

which appeared in the the Cleveland Trust Company's Business Bulletin for April.

"The five series are the number of bank suspensions, the data for money in circulation reflecting hoarding, the Bradstreet reports of the percentage of slow accounts in the totals of collections, the velocity of the circulation of money, and the ratios between the prices of 10 high grade rail bonds and 10 medium grade rail bonds.

"In each case the average for the entire period was taken as being equal to 100, and the weekly data were expressed as percentages of that average. All the series were so computed that percentages above 100 reflected responses to sentiment better than average, while those below 100 reflected more depressed sentiment. The five series were then combined into a single index, and in this process they were given equally effective weights, which means that they were all assumed to be of equal importance.

"The resulting line of the combined index fluctuated well above the 100 level in 1929, with an abrupt advance just before the break in stocks that started the bear market, and with a rapid decline afterwards. It remained above 100 during most of 1930, with an advance in the spring, and a sharp decline in the autumn. The same pattern was repeated at a level well below 100 in 1931. The present year began with the line at 79, and the recent advance has carried it just above 87. There is no way to test the accuracy of the index, but it does appear to reflect with some real degree of fidelity the more important changes in general business sentiment since the beginning of 1929."

It tends to suggest that while lack of confidence is still one of the most important factors retarding increased business activity, a turn has most definitely taken place. Continuation of this "upward turn of sentiment" will have a very definite influence on conditions of the near future.

POSITIONS WANTED

Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wis.

SHOVEL OPERATOR

12 years' experience on Gas+Air and steam machines on highway grading and basement excavating. Willing to go any place in U.S.A. Married. Can do own repair work and furnish reliable references. Present location, North Carolina. Box 3301.

DRAGLINE OPERATOR

Experience covers 11 years' on Diesel and gasoline draglines on drainage canal, levee and rock work. Willing to go anywhere in U.S.A. Married. 30 years old. Can handle own repair work and furnish A-1 references. Present location, Arkansas. Box 3302.

CRANE-SHOVEL OPERATOR

16 years' of experience operating gasoline and steam machines on highway and rock grading and general excavating. Prefer operating small gas or steam shovel anywhere in the East. Married. Age 36 years. Can do own repair work and furnish first class references. Present location, New York. Box 3303.

SHOVEL OPERATOR

Have ten years' experience on Gas+Air, gasoline and steam shovels. Willing to go anywhere in U.S.A. Married. Best of references. Can do own repair work. Present location, Wisconsin. Box 3203.

DRAGLINE-SHOVEL-CRANE OPERATOR

18 years' on gasoline, gas+air, Diesel and steam machines on general excavating, coal and ore stripping and highway grading. Will go anywhere. Married. A-1 references. Age 38. Present location, Illinois. Box 3404.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie Diesel, E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 3305.

DRAGLINE-SHOVEL OPERATOR

14 years' experience on Diesel, gasoline and steam machines on highway grading and levee building. Would like to operate dragline anywhere in U. S. A. Married. Can do own repair work. A-1 references. Present location, Arkansas. Box 3306.

CRANE-SHOVEL OPERATOR

Have 35 years' experience on gasoline and steam machines on highway and railroad grading; canal and quarry rock. Willing to go anywhere in U.S.A. on any size or make shovel. Married. Can furnish the very best of references and can handle own repair work. Present location, South Carolina. Box 3304.

DRAGLINE-SHOVEL OPERATOR

Have had thirteen years' experience operating Bucyrus-Erie 20-B, 30-B, 50-B and 175-B steam, Diesel and electric machines. Have built levees, road and railroad embankments; dug canals, gravel and stripped phosphate. Can furnish good references. Willing to go anywhere in U.S.A. or foreign countries. Present location, Louisiana. Box 3402.

DRAGLINE-CRANE-SHOVEL OPERATOR

Over ten years' experience on gasoline, Diesel and steam machines on drainage, levee and mine stripping. Willing to go anywhere. Single. Can do own repair work. Reliable references. Present location, Texas. Box 3212.

CLAMSHELL-SHOVEL OPERATOR

Thirteen years' experience on railroad, canal, highway, street and basement excavating. Can carry A-1 grade and produce yardage. Can do all necessary repair work and furnish reliable references. Present location, Ohio. Box 3209.

DRAGLINE-SHOVEL OPERATOR

8 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U.S.A. Also have two years' machine shop experience. Can do own repairing and furnish A-1 references. Present location, Florida. Box 3406.

DRAGLINE-SHOVEL OPERATOR

Experienced on Diesel, Gas+Air and gasoline machines on highway grading and pit stripping. Willing to go anywhere in U.S.A. or South America. A-1 references. Can do own repair work. Present location, Florida. Box 3207.

SUPERINTENDENT-DRAGLINE OPERATIONS

Have superintended dragline and shovel work for many years on mining operations of various types, also rock quarries. Willing to go anywhere in U.S.A. 43 years old. Have excellent references regarding character and ability. Present location, Tennessee. Box 3211.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

22 years' experience on Gas+Air, gasoline and steam machines on highway, coal stripping operations, irrigation work, pile driving and many other miscellaneous jobs. Will go anyplace in U.S.A. Can handle own repair work. Married. Can furnish excellent references. Present location, New York state. Box 3405.

DRAGLINE-CLAMSHELL OPERATOR

Experience covers years on Diesel and gasoline machines on levee and highway work. Willing to go anywhere in U.S.A. Single. Age 27. Can do own repair work and furnish reliable references. Present location, Louisiana. Box 3403.

DRAGLINE-SHOVEL OPERATOR

Experienced on Bucyrus-Erie D-2 and 30-B Diesel machines, on highway grading and canal drainage. Will go anywhere. Married. Age 37. Reliable references furnished. Can handle own repair work. Present location, Kentucky. Box 3204.

EXCAVATING SUPERINTENDENT

Have years of experience as superintendent on all types of excavating work on large scale. Understand the building and operating of sand screens up to 50 carloads per day. Can operate gasoline and steam machines—Bucyrus-Erie preferred and can handle own repairing. Hold U. S. Civil Service rating of 91%. Can furnish excellent government references. Married. Present location, Maryland. Box 3213.

CLAMSHELL-SHOVEL OPERATOR

Experience covers twenty-one years in quarry, sand and gravel loading. Prefer operating Bucyrus-Erie steam shovel in central states. Can do own repair work. Excellent references furnished. Married. Present location, Ohio. Box 3208.

SHOVEL OPERATOR

Have 13 years' experience on Diesel, gasoline, Gas+Air, electric and steam machines on highway and railroad grading, quarry work and general excavating. Married. Willing to go anywhere. Can do any repair and service work. Familiar with Diesel engines. Reliable references. Present location, Tennessee. Box 3307.

HOPPER OPERATOR

Wanted—Bachelor job as hopper operator on road work. Fully experienced on all types of highway building. Can also serve as tractor operator. Single. 30 years old. Willing to go anywhere in U.S.A. Reliable references furnished. Present location, Indiana. Box 3308.

DRAGLINE-CRANE-SHOVEL OPERATOR

Have nine years' experience on gasoline, electric, Diesel and steam machines on highway, subway, sewer and hydro-electric work. Prefer operating gas or Diesel machine any place. Married. Can do own repairing. At present located in New York State. Box 3205.

DRAGLINE-CRANE-SHOVEL OPERATOR

Experience covers eighteen years on large and small gasoline, Diesel and steam machines on general excavation, scow loading, lock and dam excavating. Willing to go anywhere on large or small machine. Married. Can furnish excellent recommendations. Fully capable of handling any repair work on machines. Present location, Illinois. Box 3206.

CONSTRUCTION AND MAINTENANCE ENGINEER

Over 25 years' experience on all types of shovel, cranes, locomotives on general construction work. Capable of taking full charge of crew. At present located in Australia. Available for work in New Zealand, China or Federated Malay States. Can furnish excellent recommendations. Address replies to W. J. A., 22 Ruthven Street, Waverly, N. S. Wales, Australia.

DRAGLINE-SHOVEL OPERATOR

Have twelve years' experience on Bucyrus-Erie, Monighan, Marion, Osgood, Northwest, Koehring, Link-Belt and P. & H. shovels and draglines—steam—Diesel and gasoline on drainage, quarry and ore pits and on general excavating. Willing to go anywhere in U.S.A. or foreign countries. Can do own repairing and furnish reliable references. Present location, Indiana. Box 3401.

R. H. Cunningham & Sons Building South Approach for West End-North Side Bridge

(Continued from Page 240)

along the footer line with a Bucyrus-Erie 50-B steamer with 70-foot boom and McKiernan-Terry 5,000 and 10,000 pound hammers. This piling was then braced with heavy timbers, and alternate pockets 15 feet long were excavated with a Bucyrus-Erie 30-B Diesel, 40-foot boom, handling a Blaw-Knox clamshell bucket. Bracing was then transferred to the backs of completed sections and the alternate sections completed in like manner. The sheet piling was left in place. Material excavated was mostly used to backfill the new wall. Ingersoll-Rand and Chicago Pneumatic compressors furnished air for hammers used in breaking pavement, taking out old retaining walls, and breaking up tough spots in the slag fill.

Plywood lining of forms gives excellent surface to concrete

All exposed concrete faces are specified to have a rubbed finish. In order to do away with all board marks and other irregularities which are at any time hard to finish properly. The faces of all forms before pouring are lined with sheets of 3-ply wood veneer, purchased in commercial sizes of 4 feet by 8 feet and fastened to the forms by means of three penny finishing nails. These sheets are about one-fourth inch thick, can be used on both sides, and can be used six to eight different times.

When the forms are stripped from the concrete the surface is left straight and smooth, and can be brought to a beautiful finish with a minimum of rubbing.

The walls already finished present a very handsome appearance and the R. H. Cunningham & Sons Company has received many well deserved compliments on the uniform color and finished appearance of the completed walls.

All of the concrete used on the south approach contract has been furnished by McCrady-Rogers Company and Ready Mixed Concrete Company, delivered to the job ready mixed in 3-yard truck loads. This concrete, furnished by these two Pittsburgh dealers, has given exceptionally good breaking tests on test cylinders. They are delivering all concrete for the superstructure over the new bridge which enables the contractor to do his pouring by gravity. Much of the concrete is conveyed by a Barber-Greene conveyor from trucks to forms where it cannot be dumped directly to place.

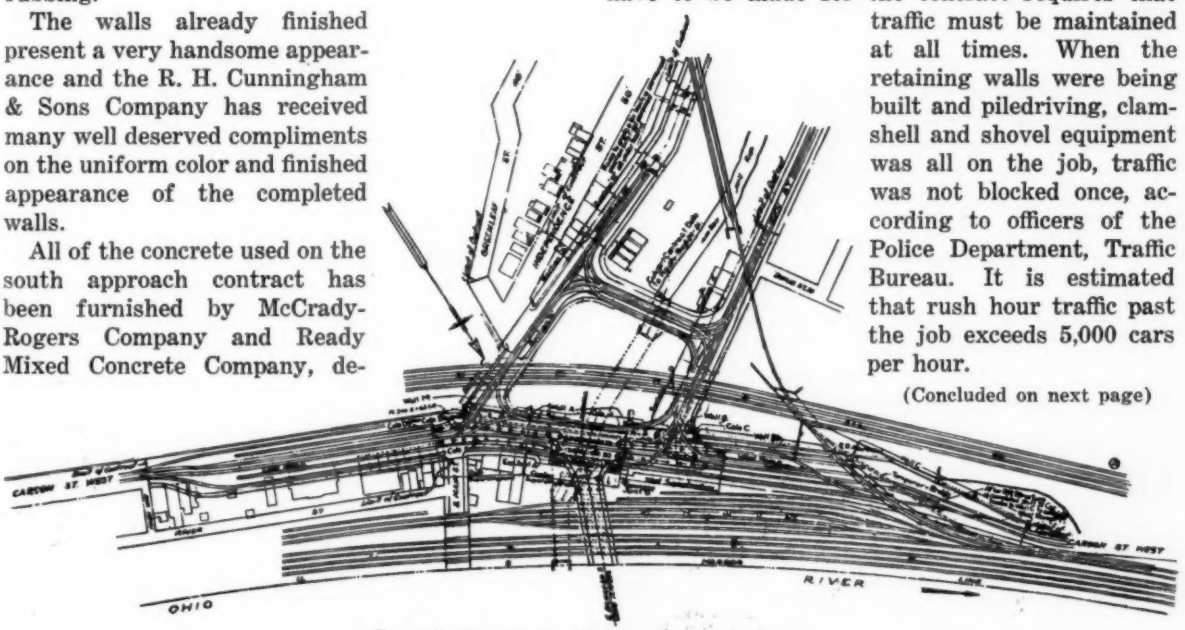
Steuben Street looking south. The old ashlar masonry arches carrying the Pennsylvania over Main and Steuben Streets will be dropped to provide part of the fill for the earthen ramps to superstructure.

Traffic on superstructure over Carson Street will all move one way.

Between Steuben Street and Main Street a flat reinforced concrete slab superstructure will be laid on reinforced octagonal columns, which will be placed approximately 25 feet on centers on four-foot diameter circular foundations that extend to bedrock. These octagonal columns will be the size of an octagon circumscribed about a two-foot six-inch diameter circle.

Careful planning and handling of equipment during the construction of this superstructure will have to be made for the contract requires that traffic must be maintained at all times. When the retaining walls were being built and piledriving, clamshell and shovel equipment was all on the job, traffic was not blocked once, according to officers of the Police Department, Traffic Bureau. It is estimated that rush hour traffic past the job exceeds 5,000 cars per hour.

(Concluded on next page)



General plan of the south approach contract

All through-traffic, except street-cars, on Carson Street will pass on approximately the same level as the present street, on 20-foot roadways on each side of the ramps to superstructure. This will give all down-river traffic clear sailing without intersecting streets, from Point Bridge to Corliss Tunnel—a distance of about two miles.

All traffic to the West End (South Main Street and Stuben Street), all traffic for the bridge, and all street cars must mount the ramp to the superstructure of approach. The traffic on the superstructure, on the passes under the Pennsylvania tracks, and on the new 40-foot street south of the railroad embankment will be one-way traffic. The fill for this new 40-foot roadway was slag from nearby steel mills. Traffic from the west for the bridge and also bridge traffic wishing to go east must pass under the Pennsylvania tracks twice in order to eliminate left hand turns through traffic, while street cars from the west must also pass under the Pennsylvania tracks twice so that traffic on the superstructure will be all one-way traffic.

The present underpasses under the main line of the Pennsylvania Railroad at South Main Street and Steuben Street, having been built of heavy ashlar masonry similar to the retaining walls, are not high enough to allow sufficient headroom for traffic to and from the superstructure. Consequently Allegheny County is replacing the old masonry arches with through-plate girder bridges which will allow the greatest possible headroom for the earthen ramps. The old masonry arches will be dropped to provide part of the fill required. This work is being carried on by the Dravo Contracting Company, Pittsburgh, under the supervision of the Pennsylvania Railroad.

R. J. Cunningham, Secretary and General Manager, is in charge for R. H. Cunningham & Sons Company, with E. B. Wagle, Superintendent, and J. K. Elliott, Engineer. For Allegheny County, the Bureau of Bridges, a part of the Department of Highways of which Frank J. Chester is Director, is headed by V. R. Covell, Chief Engineer; with C. K. Harvey, Principal Assistant Engineer; A. A. Henderson, Engineer of Construction; and R. L. Horne Resident Engineer. A. D. Nutter is Engineer of Bridge Design for the Bureau.

R. H. Cunningham & Sons Company has at present another job on which things are humming right along. It is an Allegheny County road job on Clever Road some two miles west of McKees Rocks. Four shovels, one 50-B, two 41-B and one 31-B Bucyrus-Eries, all steamers, are working on this job of 210,000 cubic yards. Loading equipment consists of Linn tractors, and Western Wagons hauled by Caterpillar and Monarch tractors. Williamsport Wire Rope is used on all of the Bucyrus-Eries.

FOR SALE

Space under this heading is available at the following rates, payable in advance of publication:

1 to 3 inches.....$5.50 an inch net
Over 3 to 7 inches..... 5.25 an inch net
Over 7 inches..... 5.00 an inch net

An inch is measured vertically on one column—three columns to a page. Any space may be used measured by the even inch in height and by one, two or three columns in width.

The price per inch is based on total space used—multiply ad. space by number of continuous insertions.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

ERIE TYPE B-2 HIGH LIFT STEAM SHOVEL. "Cat" mounted. Good operating condition. Will rent. Box 316-SS.

OSGOOD GASOLINE ONE-CUBIC-YARD COMBINATION SHOVEL-CLAMSHELL-DRAGLINE. Six cylinder Beaver motor. Overhauled late 1931. Bargain price. Box 323-SS.

ERIE TYPE B-2 high lift steam shovel, "Cat" mounted. Good operating condition. Will rent. Priced to sell. Box 286-SS.

FIVE TYPE A BUCYRUS-ERIE STEAM SHOVELS. Good value. $500 each.

FOUR TYPE B BUCYRUS-ERIE STEAM SHOVELS. Good operating condition. $1000 each. Box 328-SS.

ERIE-GAS+AIR 1¼-cubic-yard shovel rebuilt in August on new style "cats." Used three months. Will rent. Box 287-SS.

LIMA 101, 1¼-CUBIC-YARD GASOLINE ROPE CROWD SHOVEL. Electric starter and lights. Shipped from factory late 1930. Excellent condition. Will rent. Box 322-SS.

BUCYRUS-ERIE 1¼-CUBIC YARD HIGH LIFT GASOLINE SHOVEL. Out of factory only one and one-half years. Excellent condition. Will sell right. Located Wisconsin. Box 319-SS.

ERIE TYPE B-2 STANDARD STEAM SHOVEL, "Cat" mounted. Located near New York City. Will rent. Box 317-SS.

USED TYPE "O" THEW STEAM SHOVEL, shop number about 2100; 20' boom, 16' dipper handle, ¾-yd. dipper. Good running condition. Located Milwaukee vicinity. Bargain. Box 261-SS.

ERIE GAS+AIR 1¼-CUBIC-YARD HIGH LIFT SHOVEL. Late style single shaft "Cats". Used less than six months since receiving factory rebuilding. First class condition. Located near Birmingham, Alabama. Will sell for equity but worth considerably more. Box 318-SS.

MARION MODEL 36 STEAM STRIPPING SHOVEL, shop number about 4100, 30-foot boom, 18-foot 6-inch dipper handle, 2-cubic-yard dipper, caterpillar mounted. Located near Isabel, South Dakota. Approximately $2000.00 worth of spare parts included. Immediately available. Priced to sell. Box 233-SS.

P&H MODEL 204. Shop number above 2200, combination Shovel Clamshell. 19' shovel boom, 14'6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 254-SS.

ERIE TYPE "GA-2" GAS+AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of the Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

USED BUCYRUS 30-B DIESEL SHOVEL— 25'9" Boom, 14' Dipper Handle, including Dragline Equipment. Box 251-SS.

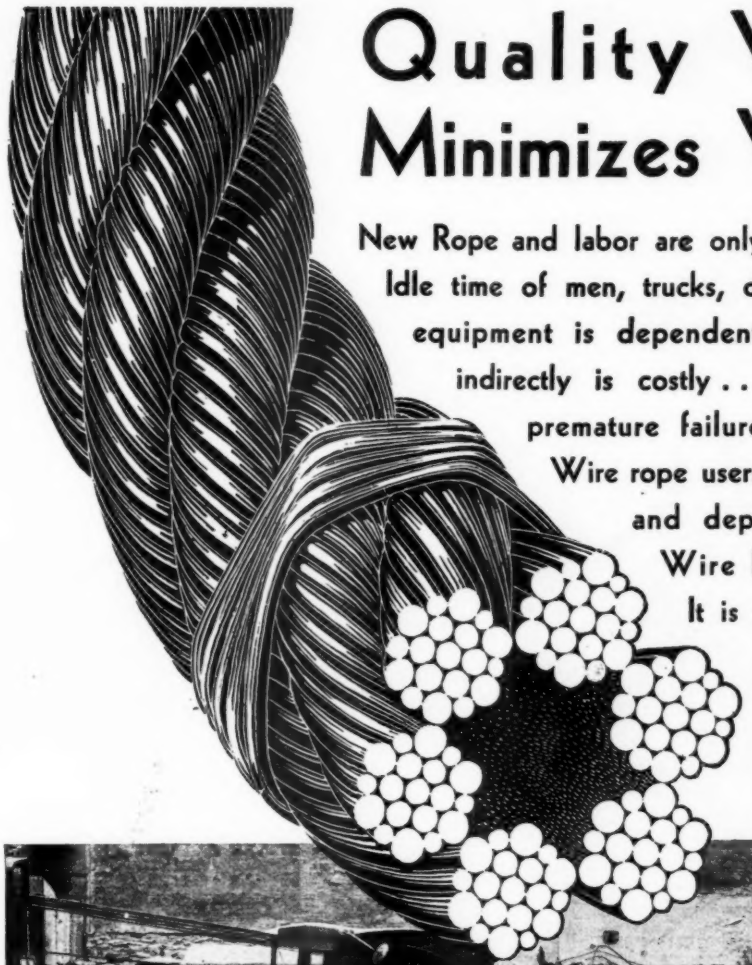
ERIE REBUILT B-2 standard steam shovel, power boom hoist, new style "Cats." Factory guaranteed. Box 252-SS.

ERIE TYPE-B high lift steam shovel rebuilt July 1931 including new boiler. Since used 4 months. Excellent condition. Will rent. Box 285-SS.

REBUILT GA-2 ERIE SHOVEL mounted on new single shaft caterpillar, 1¼-cubic-yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

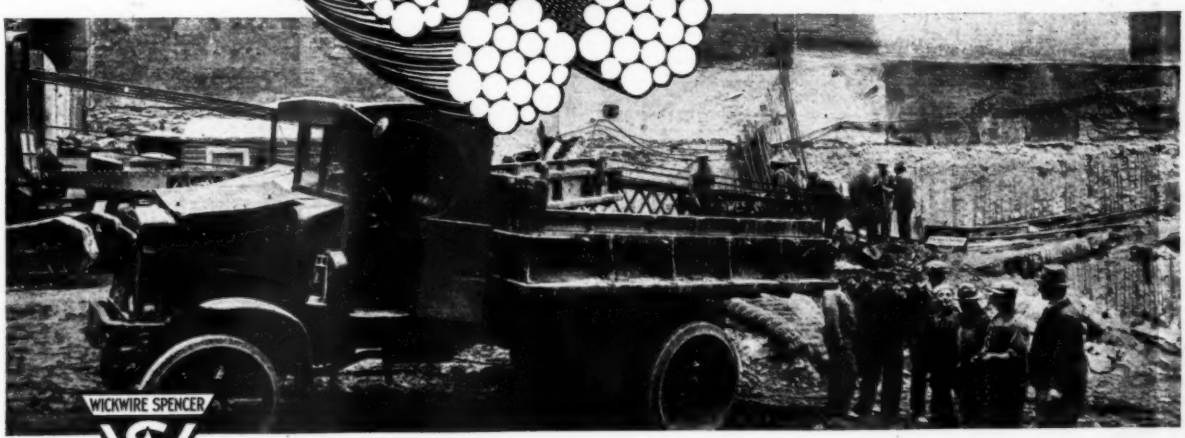
NORTHWEST SHOVEL, model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

BUCYRUS-ERIE SLIGHTLY USED 1½-CUBIC YARD ROPE CROWD GASOLINE SHOVEL. "Cat" mounted. Electric starter. Carries same guarantee as new machine. Box 320-SS.



Quality Wire Rope Minimizes Waiting Time

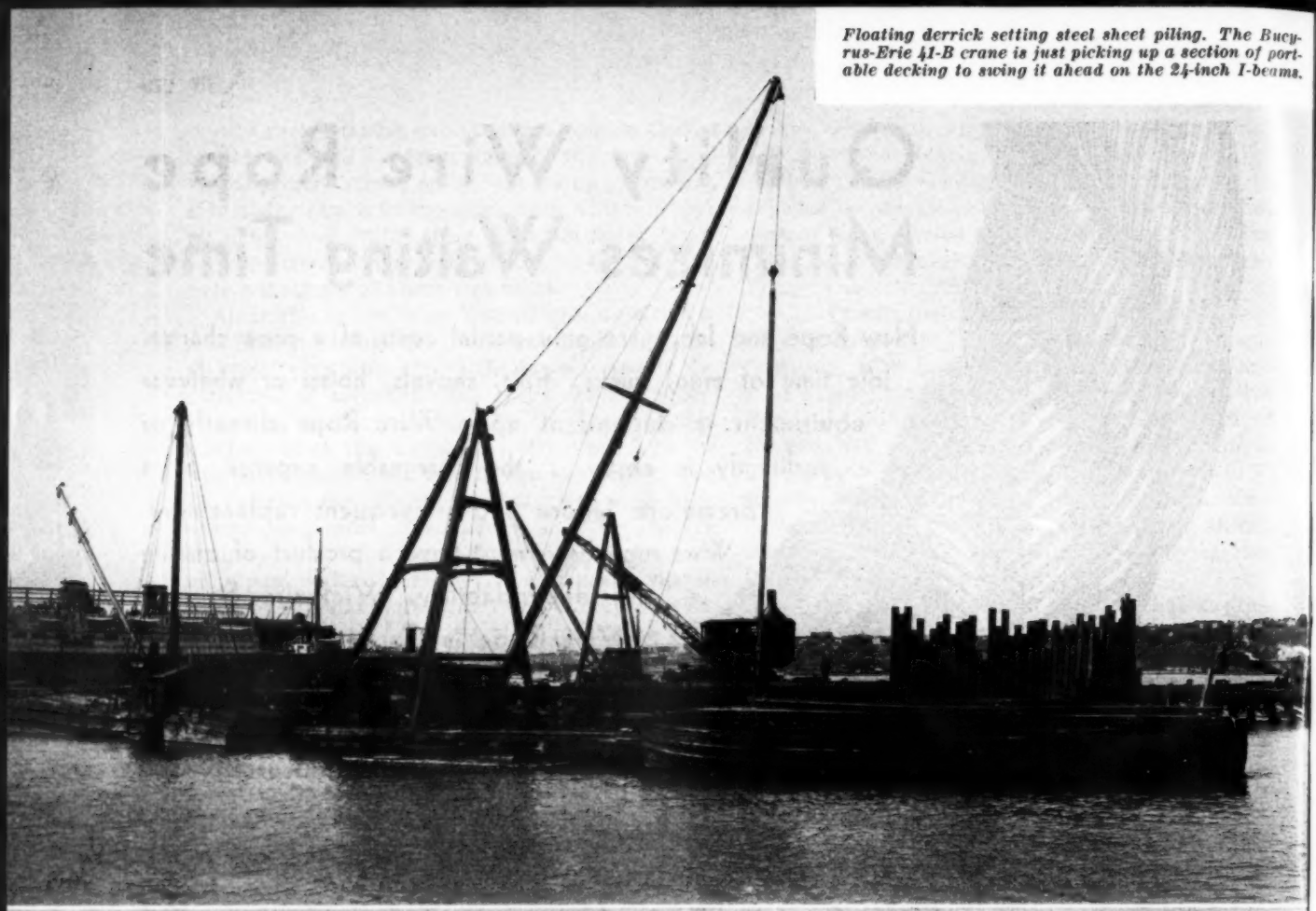
New Rope and labor are only partial costs of a rope change. Idle time of men, trucks, drills, shovels, hoists or whatever equipment is dependent upon Wire Rope directly or indirectly is costly . . . the chargeable expense of a premature failure and subsequent replacement. Wire rope users must have a product of quality and dependability. Wickwire Spencer Wire Rope is Quality Wire Rope. It is scientifically correct . . . its entire manufacture is under one control. The resulting uniformity and durability makes it long lived . . . the economical wire rope to use.



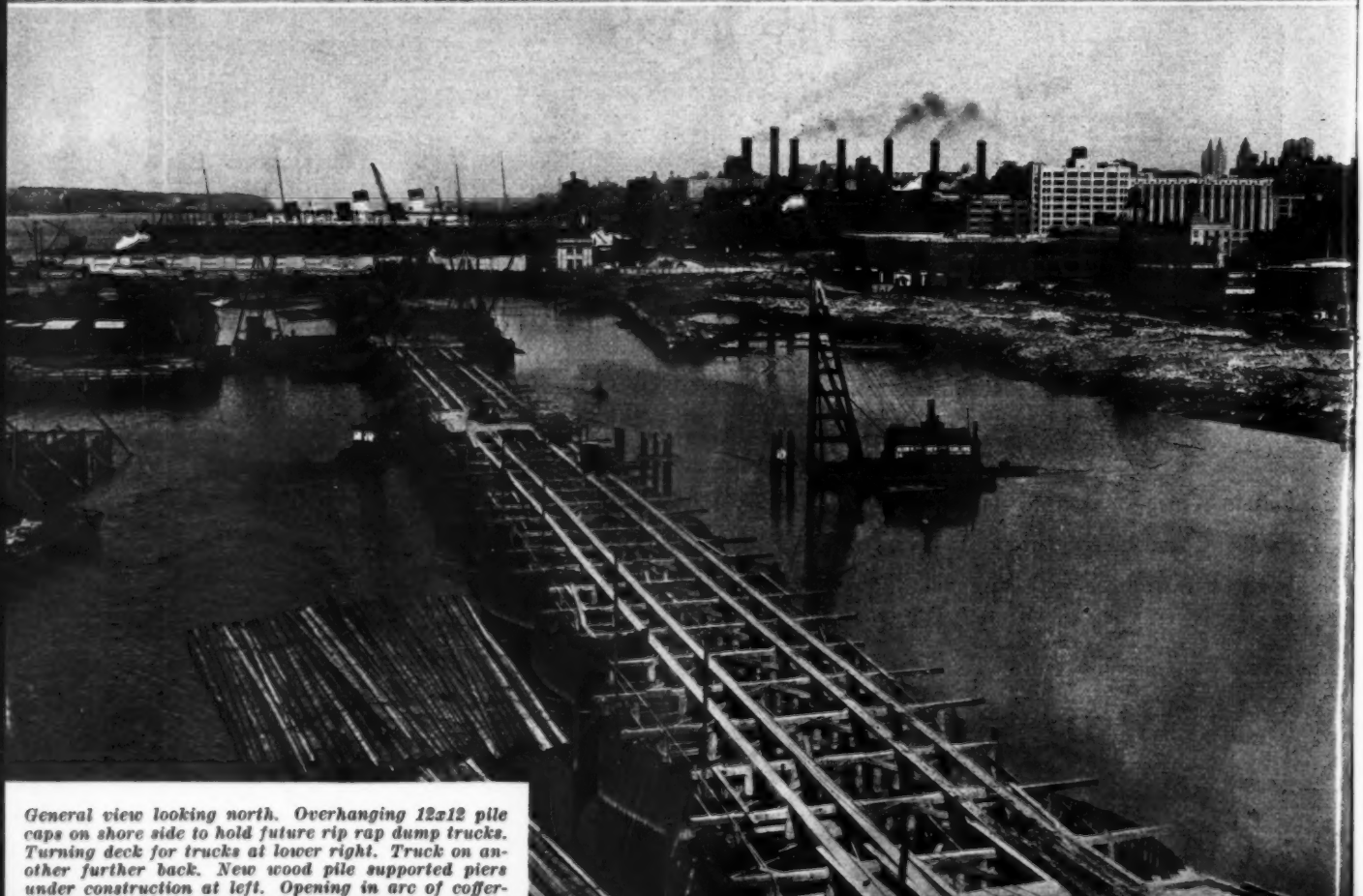
WICKWIRE SPENCER STEEL COMPANY, 41 East 42nd Street, New York City; Buffalo; Chicago; Detroit; Philadelphia; Worcester; Tulsa, 314 East Archer Street; Pacific Coast Headquarters: San Francisco; Warehouses: Los Angeles, Portland, Seattle. Export Sales Department: New York City.

WIRE ROPE *by Wickwire Spencer*

For your convenience in writing to Wickwire Spencer Steel Company, you will find a card bound in this issue.



Floating derrick setting steel sheet piling. The Bucyrus-Erie 41-B crane is just picking up a section of portable decking to swing it ahead on the 24-inch I-beams.



General view looking north. Overhanging 12x12 pile caps on shore side to hold future rip rap dump trucks. Turning deck for trucks at lower right. Truck on another further back. New wood pile supported piers under construction at left. Opening in arc of coffer-